

Exhibit B

March 21, 2011

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1 Introduction

Union Oil Company of California (“UNOCAL”), through its counsel, Strong Pipkin Bissell and Ledyard L.L.P. retained Sirius Solutions L.L.P. (“Sirius”) and me to analyze and determine the lost profits at UNOCAL’s hydrocarbons terminal (“Terminal”) in Beaumont Texas that were incurred because of an oil spill on the Neches River in August 2004. The Terminal is one of the types of facilities that participate in and support the crude oil refining and petrochemical industries in the United States Gulf Coast.

2 Summary of Opinions

Based on my analysis of the receipts and shipments at the Terminal, the dock was a critical component of its daily operations. During 2003 and 2004 time period, nearly the equivalent of the Terminal’s entire daily volume passed over the dock in one direction or another since 80+% of the receipts came by the dock and roughly 20+% of its shipments went out over the dock. As a result of the oil spill on the Neches River, the Terminal lost the use of its most critical transportation mode and was severely handicapped until the resumption of normal operations on the Neches River, at the Terminal and by the Terminal’s customers. I examined two scenarios, a Scenario 1 and a Scenario 2, to explore possible values of the Terminal’s lost profits. My opinion is that the Terminal’s lost profits were \$733,000.

3 Information Considered

Attachment A appended to this report contains the list of information considered in this report. In addition, I interviewed the following people at UNOCAL:

- Jan Tomlinson – Supervisor Terminal Accounting
- Adam Higginbotham – Operations Supervisor
- Nita McGowin – Oil Movements Scheduler
- Mark Maxwell – Customer Service Representative
- Terry Basham – Safety Specialist

4 Refining Industry Overview

The crude oil refining industry upgrades crude oil into refined petroleum products such as gasoline, diesel, jet fuel, kerosene, heating oil, lubricants, waxes, liquefied petroleum gases, petroleum coke, asphalt, etc. and produces petrochemical feedstocks. Within the US refining industry, the United States Gulf Coast (“USGC”) refining capacity is larger than the refining capacity in any other area of the United States. Refineries in the USGC consume more crude oil than any other area of the US and produce petroleum products not only for consumption within the USGC, but also for the Midwest US and for the United States East Coast (“USEC”). The USGC refining capacity is the largest supplier of petroleum products to the US. The Terminal is one of the facilities that play a critical role in the supply chain for the crude oil refining and related industries.

Based on my experience working within the refining industry it is a seasonal industry. In addition, according to the United States Department of Energy (“DOE”):¹

There are seasonal patterns in refinery input. In the United States, refinery runs mirror the overall demand for products -- lower in the colder months and higher in the warmer months. In addition, as they move out of the gasoline season in the early autumn and then as they move into the next gasoline season in the late winter, refiners routinely perform maintenance. The duration and depth of the cutback in refining activity during each maintenance season is affected by a variety of factors, including the relative strength of the market for refined products. Therefore, when stocks are high and demand slack, the refinery

¹ http://www.eia.doe.gov/pub/oil_gas/petroleum/analysis_publications/oil_market_basics/refining_text.htm

maintenance season is likely to be longer and deeper. Refinery activity will also respond to the market's need (and hence relative prices) for product, with changes in the level of crude oil throughput as well as emphasis on one product over another.

An easy way to visualize the seasonal patterns is to examine the US gasoline supply. Gasoline is one of the largest refined petroleum products by volume in the US. As shown in Figure 1 below, US gasoline supplies peaked in the months of May to August and fell significantly starting at the beginning of the month of September, which marks the end of the summer driving season.

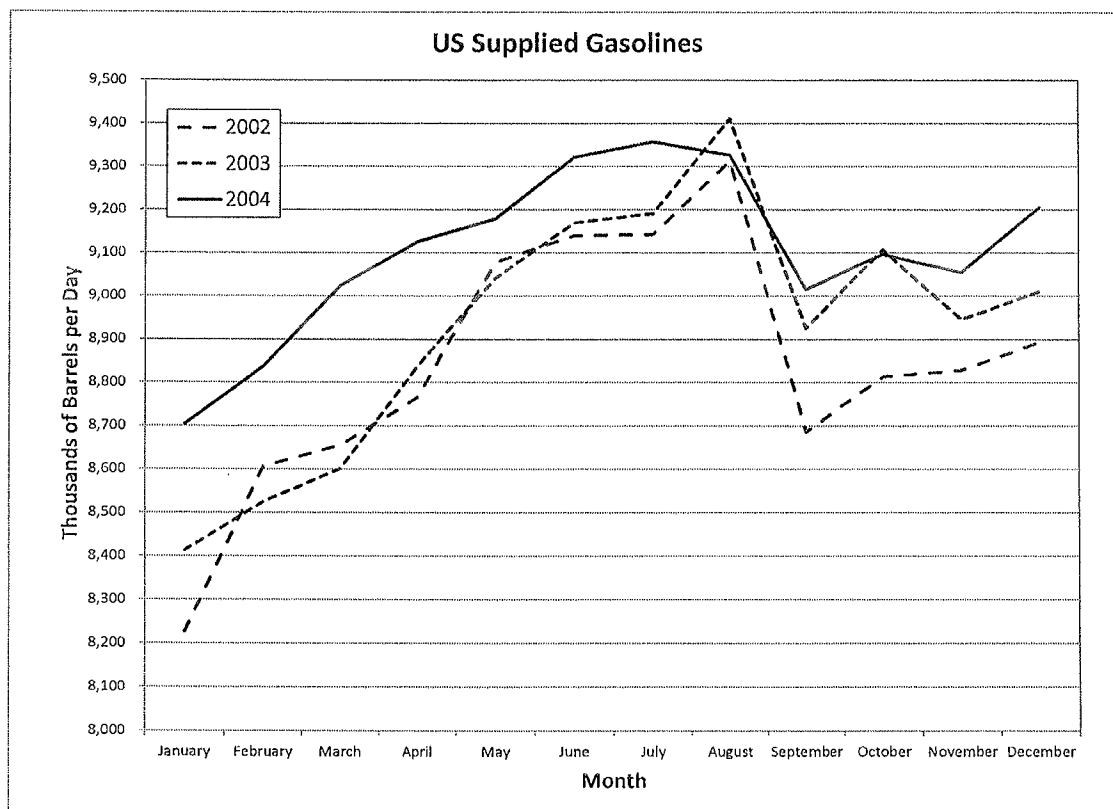


Figure 1: US Gasoline Supply 2002-2004. Source: DOE

1 Figure 2 below expands on the information in Figure 1 to include all refined petroleum products
2 supplied. There are two things to note from Figure 2. First, Figure 2 shows the same seasonality
3 that Figure 1 demonstrates, but is partially muted by the addition of other petroleum products,
4 including products that are produced in the winter months such as heating oil. For all three years
5 shown, the summer months were higher than the winter months. In addition, there was a
6 noticeable drop in volume per day in September of each year, which marked the end of the
7 summer driving season.

8 The second item is that volumes per day in 2004 are noticeably larger than the volumes per day
9 in 2002 and 2003. This information indicates that refining industry participants were having a
10 better year in 2004 in terms of volume than in the previous two years.

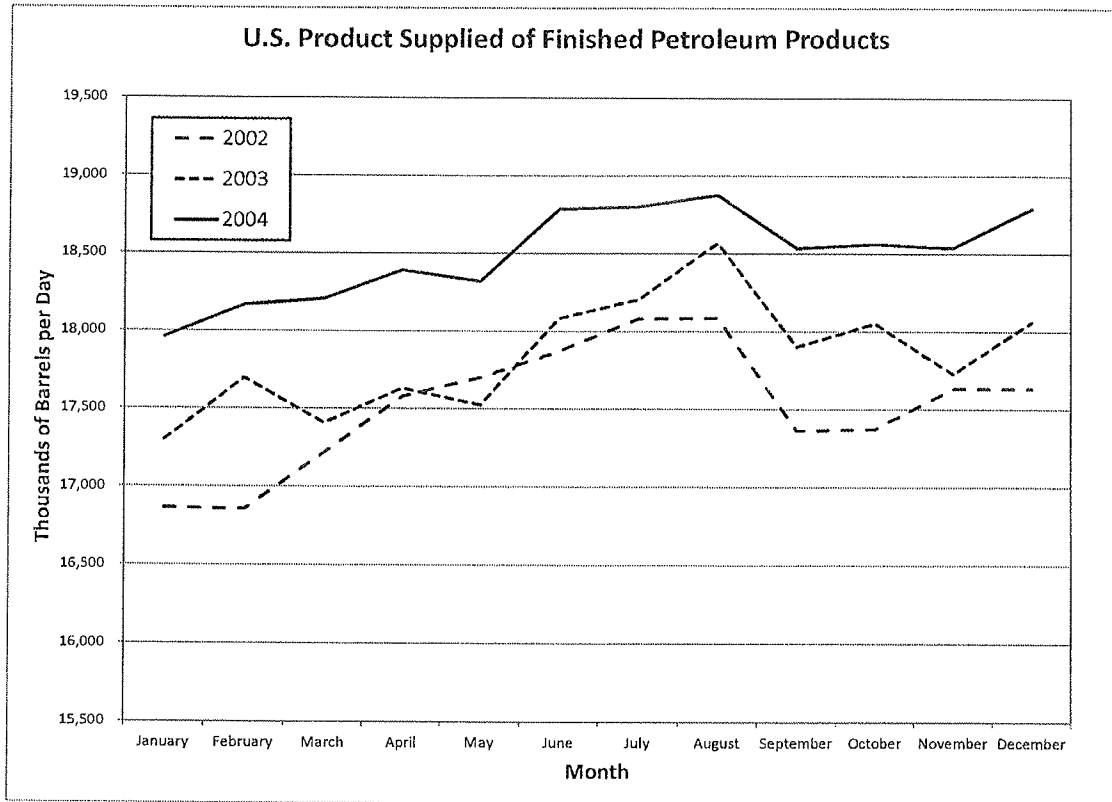


Figure 2: US Petroleum Products Supplied. Source: DOE

- 1 Figure 3 below presents the price of crude oil from the NYMEX futures exchange for the prompt
- 2 month (nearest month) from January 2002 through December 2004. As can be seen in the figure,
- 3 crude prices in 2004 were significantly higher than in the prior two years. This also coincided
- 4 with an increase in the volumes of petroleum products delivered in the US as shown in Figure 2.

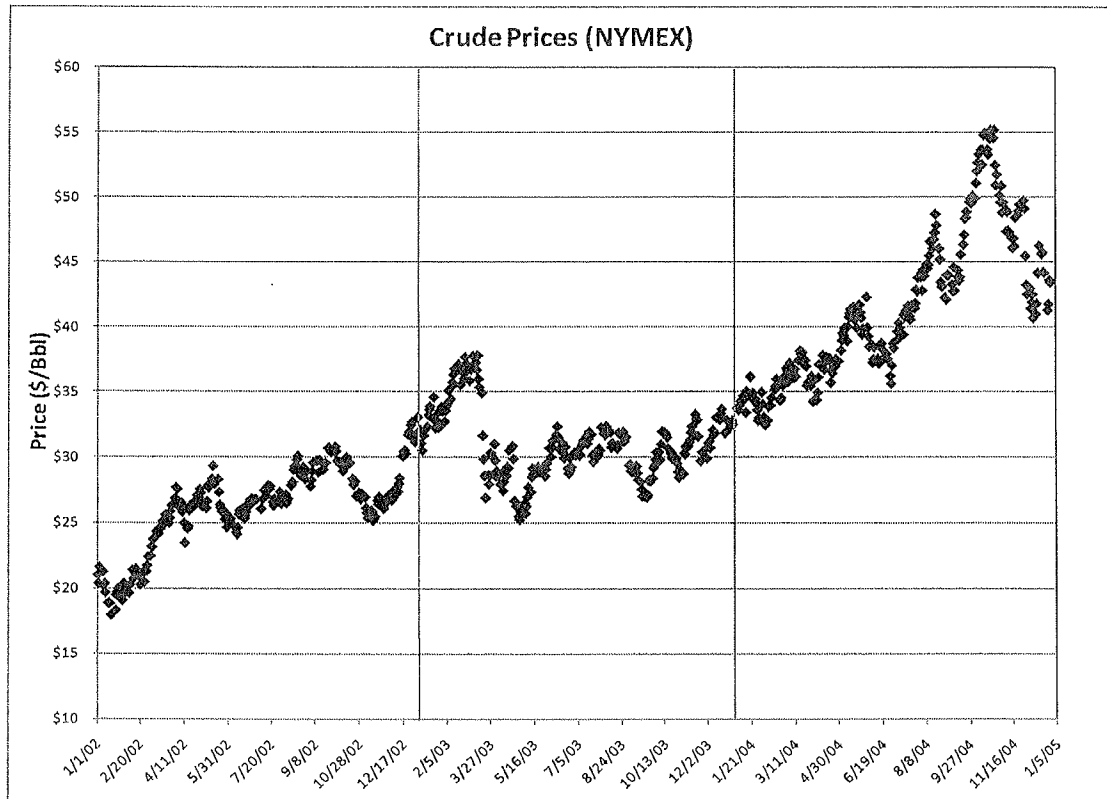


Figure 3: NYMEX Futures Price for Crude Oil

5 UNOCAL's Terminal Overview

5.1 Description

- 1 In 2004, UNOCAL owned and operated a terminal ("Terminal") on the Neches River. The
- 2 Terminal operated much like a toll bridge. The Terminal generated revenue by having customers
- 3 pay to have the customer's materials pass through and utilize the Terminal's receiving, shipping
- 4 and storage capabilities. These materials were crude oil and other hydrocarbon commodities used
- 5 and produced in the crude oil refining and petrochemical industries. Therefore, the performance

1 of the Terminal was interdependent on the performance of the refining and petrochemical
2 industries.

3 Until Chevron's acquisition of UNOCAL in 2005, UNOCAL did not operate the Terminal for its
4 own materials. UNOCAL did not take title to any materials received, shipped or stored at the
5 Terminal. UNOCAL only handled third party materials and operated as a merchant terminal. As
6 a merchant terminal, the Terminal only provided receiving, shipping and storage services at the
7 Terminal location. Third party customers had title to the materials and were responsible for the
8 acquisition or sale of materials, arranging and paying for transportation to or from the Terminal
9 and paying any taxes or duties owed, etc.

10 Third party customers utilized the Terminal because it had the capability to receive materials by
11 ship, barge, pipeline, tanker truck and rail and had the capability to ship the third party's
12 materials by ship, barge, pipeline, tanker truck and rail as depicted in Figure 4 below. Customers
13 were responsible for providing the Terminal with instructions that contain the date of the receipt
14 or shipment of materials, the type and quantity of material, the transportation mode and name of
15 the carrier, inspection instructions, etc. The lead-time provided to the Terminal can range from
16 30 minutes to several weeks or longer depending on the particular situation. In many instances,
17 customer instructions were not firm service orders to the Terminal since customers can sell or
18 purchase a cargo of materials during transit and/or change the final destination during transit.
19 Instead, customer instructions were like dinner reservations at a restaurant. The reservation

1 becomes an actual business transaction when the customer showed up for dinner, but the
2 customer was not obligated to keep the reservation.

3 The reason that customers can sometimes provide lead-times of several week or longer is that
4 customers often have to make transportation and logistics decisions ahead of time in order to
5 secure the carrier, transit of the commodity from the departure location to the arrival location and
6 make a reservation at the terminal. This means a disruption in one month can affect logistical
7 decisions for the next month.

8 Exhibit 1 to this report contains the volume data for 2003 and 2004. As shown in Figure 4, the
9 Terminal received 81% of its receipts (inbound) via the dock in 2003. Figure 4 also shows that
10 the Terminal shipped 21% of its shipments (outbound) via the dock in 2003. The 2004 data in
11 Exhibit 1 shows that the Terminal's dock received 85% of the receipts and made 24% of the
12 shipments. Therefore, the dock and its access to the Neches River was a very significant
13 transportation mode for the Terminal's daily business. Without the use of the dock, the Terminal
14 was severely handicapped to service its customers.

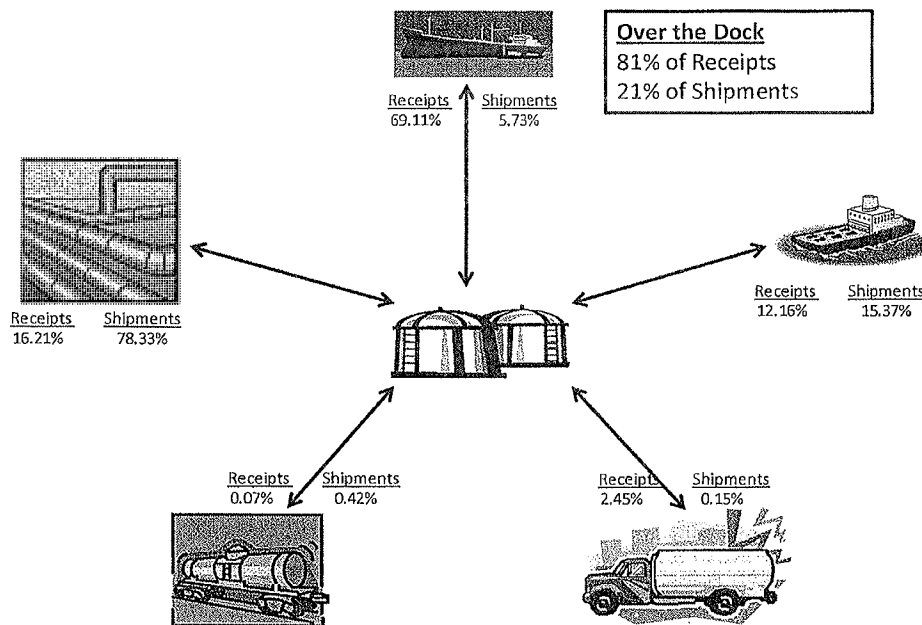


Figure 4: 2003 Volume Activities

- 1 The Terminal's dock location is of strategic importance to its business because the dock provides
- 2 the Terminal with access to the world crude oil and hydrocarbons markets. Furthermore, the
- 3 USGC location provides the Terminal with the ability to connect one of the world's largest
- 4 refining and petrochemical complexes, the USGC, with the global hydrocarbons market.
- 5 Table 1 below further examines the materials received at the dock and shows that in 2003 and
- 6 2004, 90% of the Terminal's dock receipts were for crude oil and naphtha based on volume.
- 7 Naphtha is a gasoline boiling range material that refiners and petrochemicals trade to either
- 8 further refine and blend into gasoline or use as a feedstock for petrochemicals.

Table 1: 2003 and 2004 Dock Activity

	2003		2004	
	Bbls	%	Bbls	%
Crude	62,768,538	82.84%	54,468,441	76.35%
Cyclohexane	198,977	0.26%	343,748	0.48%
GBS/Alkylate	841,155	1.11%	308,040	0.43%
GBS/Reformate	211,468	0.28%	251,613	0.35%
GBS/Tol-Xyl Mix	20,296	0.03%	0	0.00%
Methanol	2,905,599	3.83%	2,823,616	3.96%
Naphtha	6,588,716	8.70%	9,505,926	13.32%
Aviation Gasoline 100 LL	45,842	0.06%	127,285	0.18%
GBS/CAT 12 Naphtha	0	0.00%	107,979	0.15%
Mixed Xylene	996,661	1.32%	1,351,537	1.89%
Xylene	624,188	0.82%	670,827	0.94%
Recovered Oil	4,936	0.01%	835	0.00%
Light Cycle Oil	139,111	0.18%	890,700	1.25%
GBS/FCC Gasoline	358,934	0.47%	0	0.00%
Consol 145	10,139	0.01%	0	0.00%
GBS/Raffinate	51,754	0.07%	0	0.00%
Natural Gasoline	0	0.00%	233,241	0.33%
Raw Kerosene	0	0.00%	2,309	0.00%
GBS/MTBE	0	0.00%	52,779	0.07%
Consol C-170	0	0.00%	7,689	0.01%
GBS/FCC Light CAT Naphtha	0	0.00%	130,646	0.18%
C-340	0	0.00%	9,051	0.01%
GBS/CAT Gas	0	0.00%	58,514	0.08%
Total	75,766,314	100.00%	71,344,776	100.00%

- 1 Table 2 shows that the Terminal's top three customers at the dock were ExxonMobil Refining
- 2 and Supply, Citgo Petroleum Corp. and Lion Oil.

Table 2: Percentage of Customers at the Dock

	2003	2004
	%	%
ExxonMobil Refining & Supply	63.79%	51.87%
Lion Oil T&T, Inc.	7.91%	7.30%
Chevron Phillips Chemical Co.	0.26%	0.48%
Koch Supply & Trading LP	3.54%	7.08%
Huntsman International Fuel	3.83%	4.03%
Mobil Oil Corp.	0.00%	0.00%
Texaco Aviation Products LLC	0.00%	0.00%
Citgo Petroleum Corp.	13.04%	11.70%

	2003	2004
	%	%
Williams Energy Services	0.00%	0.00%
ExxonMobil Chemical Company	1.32%	1.89%
Atofina Petrochemicals, Inc.	0.82%	0.60%
El Paso Merchant Energy	0.02%	0.00%
UBT	0.01%	0.00%
Coastal States Trading, Inc.	0.00%	0.00%
BASF Fina Petrochemicals	0.81%	0.00%
Valero Marketing & Supply Co.	2.13%	3.20%
Shell Oil Products U.S.	0.06%	0.18%
Shell Trading US Company	2.44%	4.11%
Penreco	0.01%	0.02%
Glencore Ltd.	0.00%	0.34%
Plains Marketing, L.P.	0.00%	2.85%
BP Products North America	0.00%	3.66%
SemCrude, L.P.	0.00%	0.05%
Cameron Highway Oil	0.00%	0.29%
Total Petrochemicals USA	<u>0.00%</u>	<u>0.34%</u>
Total	100.00%	100.00%

Exhibit 1 also shows that for any given month, material shipments outbound did not equal material receipts inbound. Because the Terminal also had onsite tankage, customers can build and draw down inventory as desired. Hence, in the short-run, shipments did not equal receipts. Because shipments can include inventory changes, I use the receipt volumetric data as the measure of the Terminal's activities.

5.2 Operational Costs

Financial experts generally define costs as fixed costs and as variable costs. The *Litigation Services Handbook: the Role of the Financial Expert* defines fixed costs as: "An expenditure or expense that does not vary with volume of activity, at least in the short run."² Examples of a

² LITIGATION SERVICES HANDBOOK: The Role of the Financial Expert, 3rd edition, Glossary

1 fixed costs include rent, insurance, management salaries, property taxes, advertising costs, etc.

2 The *Litigation Services Handbook: the Role of the Financial Expert* defines variable costs as:

3 “Component of a business’s cost that increases as sales, or production volume (depending on
4 context) increases.”³ Examples of variable costs include raw material costs, catalysts, chemicals,
5 packaging costs, product transportation costs, utility costs etc.

6 Based on my discussions with Terminal personnel and my examination of the income statement
7 accounts for years 2003 and 2004, the Terminal did not incur any variable costs associated with
8 the receipt or shipment of materials.⁴ UNOCAL staffed the Terminal 24 hours a day, seven
9 days a week regardless of the shipment and receipt schedules. According to Adam
10 Higginbotham, the facility did not schedule personnel based on expected receipts and shipments.
11 Over the years, the Terminal staffing policy has been to staff 4 or 5 operators and a shift foreman
12 for each 12-hour shift. Therefore, labor was not a variable cost but a fixed cost.

13 The Terminal did not consume any variable raw materials, catalysts, or chemicals in its
14 operations that vary with its activities. I expected this situation since the Terminal did not
15 conduct any refining, processing or upgrading of the materials it received and stored.

16 Lastly, the Terminal did not consume any measureable incremental energy that was considered a
17 variable cost. Any incremental energy requirements were likely to be inconsequential relative to
18 its baseload requirements since the baseload includes the pumps and equipment to maintain

³ IBID

⁴ Chevron/Unocal 361-371, Chevron/Unocal 408-416

tanks, transfer materials between tanks, operate lights, sensors, heating and air conditioning, etc. Furthermore, the facility was not metered to measure any incremental energy requirements above its baseload requirements. Therefore, there were no variable energy costs at the Terminal. As a result, the Terminal did not incur variable operating costs. Rather, the Terminal had only fixed costs that did not vary with the volume of materials received or shipped.

6 The Oil Spill on The Neches River

The incident that gives rise to UNOCAL's lost profits was business interruption that resulted from the oil spill that occurred on the Neches River in August 2004. According to the United States Coast Guard ("USCG"), on August 2, 2004, an oil spill occurred on the Neches River when a barge, the Buffalo barge 405, struck and ruptured the starboard fuel tank of the tanker *Form Mary*.⁵ The USCG reported that the spill involved 25,200 gallons of oil and soiled roughly 28 miles of shoreline.⁶

7 Generally Accepted Methodologies for Measuring Lost Profits

As discussed in the *Introduction*, my assignment is to conduct an analysis and make a determination of the lost profits incurred at the Terminal because of the oil spill on the Neches River in August 2004. In this section, I provide the generally accepted definitions and methodologies used to estimate lost profits.

⁵ U.S. Department of Homeland Security United States Coast Guard Press Release, August 2, 2004

⁶ U.S. Department of Homeland Security United States Coast Guard Press Release, August 11, 2004

7.1 Lost Profits Defined

The *Litigation Services Handbook: the Role of the Financial Expert* defines lost profits as:

- (a) **Measurement of Lost Profits.** Whether the plaintiff has identified the cause of action as breach of contract, copyright or patent infringement, or violation of antitrust laws, damages usually equal the difference between the profits that the plaintiff would have realized but for the defendant's actions and the plaintiff's actual profits. Put differently, the general damages measure equals incremental sales (or revenues) less incremental costs.⁷

Figure 5 below presents the measurement of lost profits in graphical form:

But-For Scenario			Actual Scenario			Lost Profits	
	Revenue or Sales			Revenue or Sales		But-For Profits	
Less	<u>Variable Costs</u>		Less	<u>Variable Costs</u>		Less	<u>Actual Profits</u>
Equals	But-For Profits		Equals	Actual Profits		Equals	Lost Profits

Figure 5: Lost Profits Definition

Because the Terminal operated without any variable costs, Figure 5 simplifies down to Figure 6 below that presents two equivalent forms for calculating lost profits. I use the later form in this report to calculate lost profits.

	But For Revenues			But-For Volume	
Less	<u>Actual Revenues</u>		Less	<u>Actual Volume</u>	
	Lost Profits		Equals	Lost Volume	
			Times	Revenue / Bbl	
			Equals	Lost Profits	

Figure 6: Alternative forms for Lost Profits Calculation

⁷ LITIGATION SERVICES HANDBOOK: the Role of the Financial Expert, 3rd Edition, Page 3.8

7.2 Measuring the Lost Profits

Of the four generally accepted methods for measuring lost profits, I employ the Forecast Sales method to estimate UNOCAL's lost profits.⁸ I did not use the Before and After method because the oil spill on the Neches River occurred right before a transition period between seasons. Therefore, any difference in sales would confound the impact of the oil spill on the Neches River with seasonality. In addition, I did not use either the Yardstick or Market Share methods because they lack the precision needed to estimate the lost profits or lost sales in this matter. The oil spill on the Neches River only impacted a single facility in UNOCAL's global operations and industry based measures such as an industry index or market share are too imprecise to measure the impact to a single facility in a global company over a relatively short period of time.

8 Lost Profits Analysis

8.1 Approach

In my analysis of UNOCAL's lost profits, I estimate two scenarios, a Scenario 1 and a Scenario 2, to explore estimates for the actual lost profits. The differences between the two scenarios are the assumptions used to forecast the volumes of materials that the Terminal lost because of the oil spill on the Neches River. I then make a determination of the Terminal's lost profits based on the Scenario 1 and Scenario 2 results.

8.2 Historical Receipts

Figure 7 below shows the Terminal's monthly receipt for 2003 and 2004 in terms of barrels.

With the exception of January 2004 and April 2004, the Terminal was receiving volumes in 2004

⁸ Litigation Services Handbook: the Role of the Financial Expert, 3rd Edition, Page 3.8 – 3.9

1 that were greater than the volumes received until the oil spill on the Neches River. Since the
2 majority of the Terminal's receipts are for crude oil (see Table 1) and the dock handles the
3 majority of the receipts (see Figure 4), Exhibit 2 presents the crude oil receipts at the dock for
4 2003 and 2004 by month by customer. ExxonMobil, Citgo and Lion were the three largest
5 customers by volume.

6 The difference between the January 2003 and January 2004 receipts may be attributable to the
7 fact that refiners perform maintenance in the winter at periodic intervals. For example, most
8 process units only undergo turnaround maintenance every 3-5 years. Both ExxonMobil and
9 Citgo had significant reductions in their crude oil receipts in January 2004. In addition, the April
10 2004 lower dock activity can be partially explained by the fact that ExxonMobil, the Terminal's
11 largest customer, had some operational issues. First, its Beaumont 360,000 barrel per day
12 refinery had an outage.⁹ Second, its Baytown naphtha processing unit caught fire.¹⁰ Both the
13 Beaumont refinery and the Baytown chemical plant are proximately located near the Terminal
14 and Exhibit 2 shows that ExxonMobil had significant reduction in crude receipts in April 2004
15 compared to April 2003.

16 During the three months prior to the oil spill on the Neches River, the Terminal was receiving on
17 average 24,078 barrels per day more materials than received in the same time period in 2003.

18 After the oil spill on the Neches River, receipt rates in August 2004 and September 2004 fall to
19 levels below the receipts observed in the same months in 2003.

⁹ *Refining Netbacks: Outages Buoy Margins*, Oil Market Intelligence, April 2004

¹⁰ *Fire Doused at Baytown Chemical Plant*, Houston Chronicle, April 1, 2004

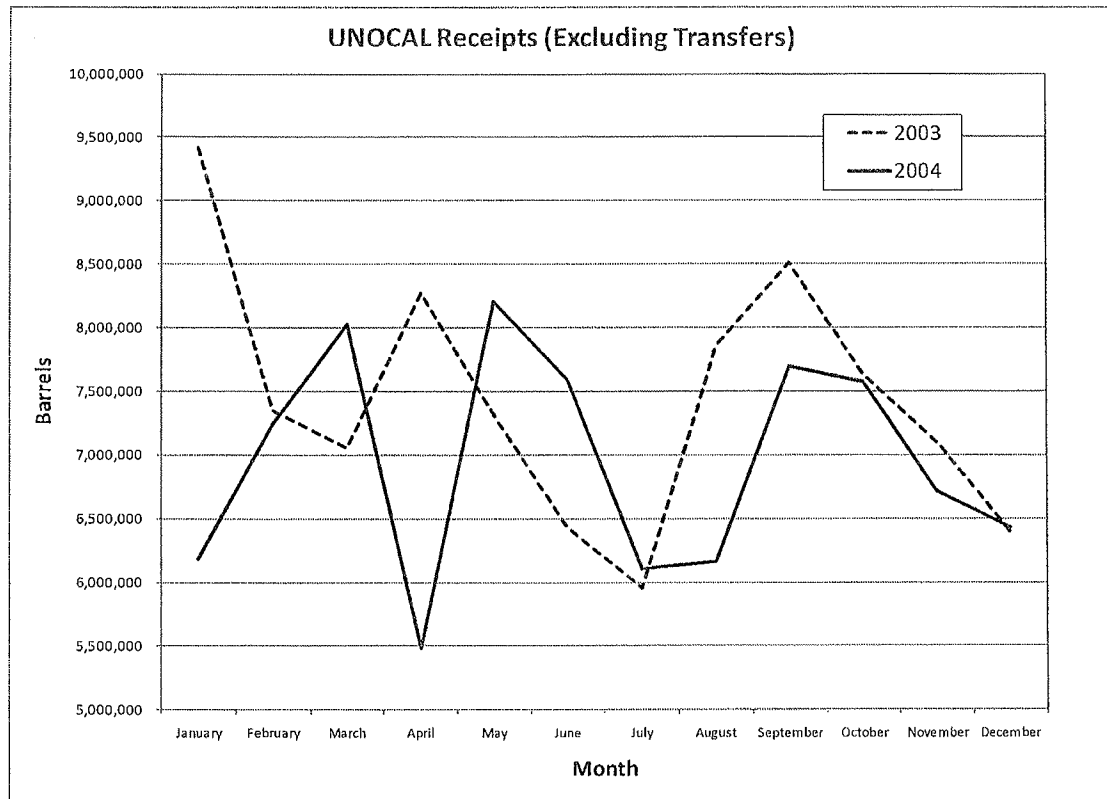


Figure 7: Monthly Receipt Rates for 2003 & 2004

8.3 Revenue in 2004

- 1 Table 3 below presents the Terminal's revenue in 2003 and 2004. The Terminal was receiving
- 2 17.5% more revenue per barrel in 2004 than in 2003. This coincides with Figure 3 that showed a
- 3 significant increase in the price of crude oil in 2004 and crude oil is a starting raw material for all
- 4 refined petroleum products and petrochemical feedstocks.

Table 3: Terminal's Revenues in 2003 & 2004

	2003	2004
Revenue	\$20,771,457	\$22,821,391
Volume Receipts (excluding Transfer)	89,310,005	83,466,316
Revenue per Bbl	\$0.2326	\$0.2734

8.4 Scenario 1

In Scenario 1, I assume that the volume of materials the Terminal received in August 2004 would have been at least equal to the volume the Terminal received in August 2003, excluding internal transfer movements between tanks. Based on the industry data presented in Figure 2 that indicates that refined petroleum product volumes in 2004 are larger than in 2003, this assumption is likely an underestimate of the Terminal's actual lost volumes in August 2004.

Table 4 presents the calculation of the lost revenues under the Scenario 1 assumptions. In this scenario, the Terminal loss is \$461,233. As discussed in 5.2 *Operational Costs*, the Terminal has no variable operating costs. Therefore, the Terminal's lost revenues equal lost profits.

Table 4: Scenario 1 Lost Profits Calculation

Scenario 1

2003 August Net Receipts [Exhibit 1]	7,857,250	A
2004 August Net Receipts [Exhibit 1]	<u>6,170,351</u>	B
Lost Volume [A-B]	1,686,899	C
2004 Revenue	\$22,821,390.93	D
2004 Net Receipt Volume [Exhibit 1]	83,466,316	E
Revenue per Bbl [D/E]	\$0.27342	F
Lost Revenue [C*F]	\$461,233	G

8.5 Scenario 2

In Scenario 2, I assume that the Terminal would have received daily volumes in August 2004 and September 2004 that are 24,078 BPD greater than the daily volumes received August 2003 and September 2003. This 24,078 BPD increment above the same months in 2003 is the same increment that is discussed in 8.2 *Historical Receipts* based on the comparisons of the daily receipts in the months of May through July for 2003 and 2004.

Unlike Scenario 1, in Scenario 2 I consider the month of August and half of the month of September. The reason I consider 1½ months is because some logistical arrangements for one month are made in the prior month in order to schedule vessels, pipelines, etc. and transit from the departure location to the arrival location. Therefore, it was likely some shipments to or from the Terminal in September 2004 were diverted away because of third-party decisions that had to be made in August 2004 when the Neches River was impacted by the oil spill.

Table 5 presents the calculation of the lost revenues under the Scenario 2 assumptions. In this scenario, the Terminal loss is \$876,027.

Table 5: Scenario 2 Lost Profits Calculation

Scenario 2	2004 August	2004 September	Total	
Days / Month	31	30		A
2003 Net Receipts [Exhibit 1]	7,857,250	8,515,637	16,372,887	B
Incremental Bbls @ 24,078 BPD * [A]	746,429	722,351	1,468,780	C
2004 Expected Net Receipts [B+C]	8,603,680	9,237,988	17,841,667	D
2004 Actual Net Receipts	<u>6,170,351</u>	<u>7,696,729</u>	13,867,080	E
Lost Volume [D-E]	2,433,328	1,541,259	3,974,587	F
Volume Included	100%	50%		G
Lost Volume included [F*G]	2,433,328	770,629		H

Scenario 2	2004 August	2004 September	Total	
Revenue per Bbl	\$0.27342	\$0.27342		I
Lost Revenue [I*H]	\$665,321	\$210,706	\$876,027	J

8.6 Results Discussion

Table 6 summarizes the results for Scenario 1 and Scenario 2. The Terminal's actual lost volumes as result of the oil spill on the Neches River are likely between the two estimates. The midpoint of Scenario 1 and Scenario 2 is \$670,000 rounded to the nearest \$10,000 and is a very conservative lost profits estimate.

Table 6: Results Summary

Summary	Scenario 1	Scenario 2	Average
Lost Profits	\$461,233	\$876,027	\$668,630
Lost Profits (rounded)	\$460,000	\$880,000	\$670,000

As discussed previously, Scenario 1 is likely an underestimate since it does not consider that the industry was doing better in 2004 than in 2003 and does not consider that some customer decisions for September 2004 had to be made in August 2004 when the Terminal was interrupted by the oil spill. Scenario 2 is more realistic since it incorporates these two facts. For these reasons, Scenario 2 should receive a heavier weighting in than Scenario 1 in determining the lost profits. Applying a 65% weighting to Scenario 2 and 35% weighting to Scenario 1, the lost profits were \$733,000.

9 Conclusion

Based on my analysis of the receipts and shipments at the Terminal, the dock is a critical component of its daily operations. Nearly the equivalent of the Terminal's entire daily volume

1 passes over the dock in one direction or another since 80+% of the receipts come by the dock and
 2 roughly 20+% of its shipments go out over the dock. As a result of the oil spill on the Neches
 3 River, the Terminal lost the use of its most critical transportation mode and was severely
 4 handicapped until the resumption of normal operations on the Neches River, at the Terminal and
 5 by the Terminal's customers. The Terminal's lost profits were \$733,000.

10 Qualifications

6 I am employed by Sirius Solutions LLLP ("Sirius") as a Director in its Legal and Economic
 7 Consulting practice. I have been employed by Sirius since October 2010. Prior to joining Sirius,
 8 I held similar positions at Huron Consulting Group, Navigant Consulting, KPMG and Arthur
 9 Andersen. As a consultant, I have performed a variety of valuations, including plant property
 10 and equipment and business and financial analyses on behalf of clients involved in disputes,
 11 transactional matters, bankruptcies, treaty disputes, breach of contract claims and insurance
 12 claims. I have provided expert testimony in the form of written reports and testified as an expert
 13 witness at trial, depositions and during mediation proceedings.

14 Before beginning my consulting career, I spent more than a decade at Amoco Corporation
 15 ("Amoco"), including assignments at the Amoco Research Center, where I conducted
 16 experimental work and performed technical and economic evaluations of natural gas conversion
 17 technologies, refining process technologies, synthetic fuels technologies and alternative energy
 18 technologies. In addition, I held various positions at Amoco in operations, environmental
 19 compliance, capital planning and supply chain planning. I have a BSE and MSE in Chemical
 20 Engineering from the University of Michigan and an MBA from the University of Chicago. I am

an Accredited Valuation Analyst through the National Association of Certified Valuation Analysts and I am a licensed Professional Engineer (Illinois). See Attachment B for my curriculum vitae.

The scope of services requested by UNOCAL is within the scope of services offered by Sirius' Legal and Economic Consulting practice and consistent with my experience and qualifications.

11 Compensation

Sirius receives compensation for this engagement in the form of hourly rates for the time incurred by Sirius professionals involved. Neither Sirius' fees nor my compensation is contingent on the conclusions reached or ultimate resolution of this case. Table 7 contains a listing of the hourly rates charged by Sirius in connection with this case, including deposition and trial testimony.

Table 7: Sirius Solutions Hourly Rates

<u>Title</u>	<u>Hourly Rate</u>
Managing Director	\$485
Director	\$350
Senior Consultant	\$250
Consultant	\$150

I have prepared this report to set forth my opinions in this matter. I have reached these conclusions and developed my opinions based on the documents and information provided to me as of the date of this report. As discovery is ongoing, I reserve the right to amend or supplement this report based on information made available to me subsequent to the date of this report. For

1 purposes of providing testimony at trial, I intend to illustrate my testimony with demonstrative
2 aids such as graphs, charts and/or slides.

3 I base my opinions on my work as described in this report through an independent review of
4 documents and through my knowledge and professional experience. I express all opinions to a
5 reasonable degree of certainty. I prepared this report solely for use in connection with this
6 matter.

Respectfully submitted on:

Date: March 21, 2011



David B. Lerman

Sirius Solutions LLLP
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Houston, TX 77027

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Email: dlerman@sirsol.com



Exhibit 1: Historical Terminal Activity

Monthly Chevron Beaumont Terminal Throughput by Type for Receipts and Shipments (BBLs)
For Fiscal Years Ended December 31, 2003 and 2004

Line	Description	2003 Receipts							2003 Shipments						
		Barge	Pipeline	Rail Car	Ship	Truck	Transfer	Total	Barge	Pipeline	Rail Car	Ship	Truck	Transfer	Total
1	January	1,532,268	1,221,080	10,293	6,535,056	122,875	173,024	9,594,595	834,638	6,905,899	32,674	492,773	11,169	0	8,277,153
2	February	914,673	1,267,763	4,099	5,038,809	120,748	216,847	7,562,939	887,439	5,315,091	28,057	48,110	7,562	0	6,286,258
3	March	807,587	1,820,845	14,857	4,265,432	144,828	560,060	7,613,611	1,050,384	4,940,299	22,837	607,773	14,710	0	6,636,004
4	April	1,730,983	1,432,909	13,556	4,937,350	163,732	948,358	9,226,888	1,236,744	5,336,092	23,653	157,383	12,471	0	6,766,343
5	May	658,575	1,549,343	0	4,896,496	218,396	1,234,126	8,556,937	1,077,965	6,258,398	32,277	442,123	17,554	0	7,828,317
6	June	652,713	1,234,053	0	4,352,339	190,651	771,980	7,201,736	1,516,050	5,088,743	38,115	429,578	9,165	0	7,081,652
7	July	273,484	1,138,814	3,861	4,268,712	271,798	531,029	6,487,698	1,383,973	5,513,462	28,833	413,772	9,157	0	7,349,197
8	August	340,470	1,558,831	4,019	5,700,736	253,194	320,009	8,177,260	1,427,491	5,290,526	32,511	611,670	14,755	0	7,376,952
9	September	902,826	1,042,531	10,905	6,345,626	213,750	521,717	9,037,354	1,420,404	6,151,374	31,520	537,207	6,123	0	8,146,628
10	October	792,752	647,898	0	6,007,222	181,208	661,851	8,290,931	689,363	6,637,315	44,916	376,395	13,464	0	7,761,453
11	November	940,609	779,744	0	5,271,567	111,903	557,488	7,661,311	993,024	6,201,414	29,504	224,554	6,447	0	7,454,943
12	December	1,310,654	781,918	0	4,105,676	196,988	426,992	6,822,228	994,140	5,229,299	25,701	697,441	10,044	0	6,956,625
13															
14	Total	10,857,594	14,475,730	61,590	61,725,020	2,190,071	6,923,481	96,233,486	13,511,615	68,867,912	370,598	5,038,777	132,621	0	87,921,524
15	% of total	12.16%	16.21%	0.07%	69.11%	2.45%			15.37%	78.33%	0.42%	5.73%	0.15%	0.00%	



		2004 Receipts							2004 Shipments						
		Barge	Pipeline	Rail Car	Ship	Truck	Transfer	Total	Barge	Pipeline	Rail Car	Ship	Truck	Transfer	Total
17	January	1,125,170	428,150	0	4,295,557	338,447	312,040	6,499,364	777,825	4,965,937	51,781	268,866	7,303	0	6,071,712
18	February	1,349,209	292,345	0	5,304,254	302,199	419,144	7,667,151	777,466	5,090,996	43,765	210,260	10,054	0	6,132,542
19	March	1,403,900	728,599	0	5,585,860	313,373	1,372,342	9,404,075	882,042	6,231,669	42,619	582,554	9,083	0	7,747,967
20	April	740,028	709,029	0	3,710,265	330,009	1,561,946	7,051,276	1,938,243	4,333,474	50,696	581,978	13,998	0	6,918,389
21	May	563,577	955,250	0	6,308,253	377,980	1,230,272	9,435,332	1,607,493	5,815,380	33,243	385,939	9,942	0	7,851,997
22	June	685,267	910,242	0	5,641,873	357,588	700,476	8,295,446	1,158,411	5,935,724	33,823	123,284	10,833	0	7,262,074
23	July	707,676	820,152	2,777	4,245,318	333,729	1,237,358	7,347,011	1,436,153	4,510,999	45,179	416,173	10,593	0	6,419,097
24	August	983,928	654,826	0	4,242,522	289,076	1,071,105	7,241,456	1,280,232	4,717,002	62,109	303,345	13,217	0	6,375,904
25	September	1,090,582	632,970	0	5,702,167	271,010	652,395	8,349,124	1,300,360	5,505,569	65,077	334,897	16,300	0	7,222,203
26	October	906,122	728,100	0	5,689,533	255,628	804,118	8,383,500	1,778,157	5,961,573	80,964	171,477	12,416	0	8,004,586
27	November	929,254	911,073	0	4,638,662	239,839	1,310,177	8,029,005	1,622,482	4,445,839	66,116	249,709	10,464	0	6,394,611
28	December	1,288,746	717,074	0	4,206,957	222,171	497,942	6,932,890	1,387,398	4,633,742	48,871	327,832	7,777	0	6,405,620
29															
30	Total	11,773,459	8,487,808	2,777	59,571,221	3,631,050	11,169,315	94,635,631	15,946,263	62,147,904	624,243	3,956,312	131,979	0	82,806,701
31	% of total	14.11%	10.17%	0.00%	71.37%	4.35%			19.26%	75.05%	0.75%	4.78%	0.16%	0.00%	



Exhibit 2: Historical Crude Receipts at the Dock

	2003 Crude Receipts at the Dock (Barrels per day)											
	January	February	March	April	May	June	July	August	September	October	November	December
ExxonMobil Refining & Supply	125,839	78,801	120,916	105,700	99,816	105,824	83,295	118,480	205,992	152,083	111,218	80,010
Lion Oil T&T, Inc.	15,899	17,527	16,678	16,453	16,393	16,484	16,810	16,014	16,625	15,910	16,451	15,974
Koch Supply & Trading LP	0	0	0	0	0	0	0	0	0	0	0	17,327
Citgo Petroleum Corp.	53,679	75,421	0	34,248	19,405	10,984	30,533	26,848	33,734	17,076	27,405	0
El Paso Merchant Energy	0	667	0	0	0	0	0	0	0	0	0	0
BASF Fina Petrochemicals	0	0	0	20,499	0	0	0	0	0	0	0	0
Valero Marketing & Supply Co.	0	0	0	15,888	0	0	0	20,641	0	16,037	0	0
Shell Trading US Company	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>16,638</u>	<u>14,788</u>	<u>9,984</u>	<u>19,130</u>
Total	195,417	172,416	137,595	192,789	135,615	133,292	130,638	181,983	272,989	215,894	165,058	132,441



2004 Crude Receipts at the Dock (Barrels per day)

	January	February	March	April	May	June	July	August	September	October	November	December
ExxonMobil Refining & Supply	102,745	108,678	51,687	35,191	101,748	106,100	82,608	78,009	87,286	102,925	70,288	85,474
Lion Oil T&T, Inc.	16,023	17,735	0	0	16,056	16,782	16,541	15,871	16,979	16,048	16,403	15,985
Koch Supply & Trading LP	0	0	99	0	20,299	0	9,662	0	0	0	0	0
Citgo Petroleum Corp.	15,938	16,945	64,800	34,923	25,705	30,652	16,790	9,625	19,196	9,713	19,945	9,611
Valero Marketing & Supply Co.	0	0	17,687	6,602	0	0	0	16,195	0	13,837	0	16,907
Shell Trading US Company	0	33,093	27,204	10,829	0	0	0	0	0	26,023	0	0
Plains Marketing, L.P.	0	0	0	21,355	0	0	0	5,782	17,442	0	20,340	2,498
BP Products North America	0	0	0	0	20,918	14,535	0	0	17,622	0	9,276	0
SemCrude, L.P.	0	0	0	0	0	0	0	68	0	946	0	47
Cameron Highway Oil	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>6,826</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	134,706	176,451	161,476	108,900	184,726	168,068	125,600	125,551	165,350	169,492	136,251	130,522



Attachment A: Documents Considered

Income Statement Accounts for 2003-2005
Income Statement Accounts for 2002-2005
Income Statement Accounts for 2006
Income Statement Accounts for 2002-2005
Annual Terminal Revenue by Customer - 2002
Annual Terminal Revenue by Customer - 2003
Annual Terminal Revenue by Customer - 2004
Annual Terminal Revenue by Customer - 2005
Annual Terminal Revenue by Customer - 2006
Daily dock traffic reports - 2002
Daily dock traffic reports - 2003
Daily dock traffic reports - 2004
Daily dock traffic reports - 2005
Daily dock traffic reports - 2006
Monthly detailed income statement accounts 2002
Monthly detailed income statement accounts 2003
Monthly detailed income statement accounts 2004
Monthly detailed income statement accounts 2005
Monthly detailed income statement accounts 2006
2004 Monthly Income Statement
QTR Activity Report
2002 YTD Activity Beaumont
2003 YTD Activity Beaumont
2004 YTD Activity Beaumont
2005 YTD Activity Beaumont
2006 YTD Activity Beaumont
Claim Summary / Determination Form US Coast Guard, Claim: N04067-002



Attachment B: David B. Lerman Curriculum Vitae

PERSONAL

Date of Birth:	June 15, 1961
Marital Status:	Married
Citizenship:	United States of America
Employment Status:	Director Sirius Solutions LLLP Legal and Economic Consulting Practice
Office Address:	1233 West Loop South, Suite 1800 Houston, Texas 77027
Office Telephone:	(713) 888-7182

EDUCATIONAL BACKGROUND

December 1983	Bachelor of Science – Chemical Engineering, University of Michigan, Magna Cum Laude
December 1984	Masters of Science – Chemical Engineering, University of Michigan
March 1996	Masters of Business Administration, University of Chicago, High Honors

EMPLOYMENT

October 2010 – Present	Director in Sirius Solutions LLP Legal and Economic Consulting Practice
October 2006 – October 2010	Director in Disputes & Investigations Practice at Huron Consulting Group LLC
June 2003 to October 2006	Associate Director, Disputes & Investigations at Navigant Consulting, Inc.
March 2002 to March 2003	Director, FAS Practice KPMG
October 1998 to March 2002	Senior Manager, Value Solutions, Arthur Andersen LLP
June 1997 to October 1998	Manager, energy consulting, Wright Killen / Ernst & Young LLP



March 1996 to May 1997

Manager, Operations consulting, PRTM

March 1985 to March 1996

Amoco Corporation – various positions in research & development, operations, environmental compliance, supply chain planning, refining planning, capital planning design & economics

OTHER SPECIALIZED EXPERIENCE:

Oil and gas and chemical industry operations
Insurance claims, property damage & lost profits
Intellectual property valuations
Commodity market & price analyses
Business and plant valuations

CREDENTIALS:

Licensed Professional Engineer (Illinois)
Accredited Valuation Analyst (NACVA)

PROFESSIONAL ASSOCIATIONS:

American Institute of Chemical Engineers
National Association of Certified Valuation Analysts

PRESENTATIONS & PUBLICATIONS:

“Clogs in the Pipeline”, *Legal Times*, May 16, 2005, David B. Lerman and Richard G. Smead

Hot Fuels: Politics and Litigation, November 9, 2007, Energy Law Institute

TESTIMONY:

Testimony Experience

- In RE: Wellman Inc. *Provided trial and deposition testimony for expert report*
- Atlantic Richfield et al. v. IMCO General Construction et al., *Provided deposition testimonies for expert and rebuttal reports*
- **Bowater Inc. et al. v. Tennessee Valley Authority**, *Provided deposition testimony for expert report*
- **CenterPoint Energy Services LLC v. The Premcor Group and Air Products** *Provided trial and deposition testimony for expert reports*
- **IGX Group v. Albemarle Corporation** *Provided arbitration and deposition testimony for expert reports*

LITIGATION SERVICES HANDBOOK

The Role of the
Financial
Expert

Third Edition

Roman L. Weil
Michael J. Wagner
Peter B. Frank

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MICHAEL J. WAGNER

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INTERACTION BETWEEN ACCOUNTANTS AND ECONOMISTS

Elizabeth A. Evans, JD, MBA, CPA, CMA, CFA

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3.1 INTRODUCTION. Other chapters in this book will assist a litigation expert in analyzing a case's issues. This chapter will acquaint accountants and lawyers with a group of professionals who offer complementary skills—economists.

Economists attempt to understand the structure and performance of the economic entity being examined. Industrial organization economists, for example, know about competitive industries, oligopolies, and the like. Once they analyze industry-specific data, they can forecast likely behavioral patterns. Labor economists understand the market for human capital and factors relevant to the earning power of an individual and occupations. Financial economists will know how the capital markets work. All will use their knowledge to establish a logical framework within which to evaluate the actions of the parties to the lawsuit.

Economists are also familiar with sources of government or other publicly available data. They know where to find the data and what biases the data may have. Finally, many economists know how to use data to devise and test hypotheses using statistical techniques and thereby create empirical proof for theories.

These skills complement those of accountants. Accountants know how financial statements and general business records arise in the normal course of business. They also understand the data supporting financial statements and business

records and their limitations. They know how to obtain, organize, and document data. They may bring their own analytic abilities to the task. Most important, from auditing, consulting, or tax preparation experience, an accountant will have firm-specific knowledge about the entity that the economist may not possess.

Every expert witness knows that in litigation at least two sides exist for every case. One side's experts will attempt to discredit the adversary's experts' assertions, assumptions, and reasoning. As a result, experts sometimes obtain the assistance of others whose knowledge does not duplicate but complements their own, in order to buttress their opinions. Economists and accountants have complementary skills. Accountants may perform analyses based explicitly or implicitly on certain assumptions; economists can test and prove the correctness (or falseness) of the assumptions. Similarly, economists may have hypotheses to test their theories about how the entity works; accountants provide the correct data for the tests or do the computations involved, or both. Some experts have training in several disciplines and thus combine the expertise of accountants, economists, and statisticians.

3.2 PARTICULAR STRENGTHS OF ECONOMISTS. This section focuses on the areas in which economists have had specific training that other experts cannot easily duplicate. These areas include economic modeling (often using regression techniques), defining markets, and understanding price theory and the implications of market risk.

(a) Economic Modeling. Economists often understand regression techniques, one use of which is to model what would have happened but for certain events. In fact, an entire branch of economics—econometrics—applies statistical methods to the study of economic data and problems. One such method, regression analysis, applies a statistical technique to develop an equation depicting the relation among variables and then may use that equation for prediction.¹ For example, an expert may need to predict the sales that a firm would have made but for the defendant's actions. He could use a regression analysis that models the relationship between the firm's sales and other relevant factors (e.g., total industry sales) over a control period preceding the defendant's actions to predict what sales would have been in the absence of those actions. Similarly, if an expert needs to estimate how a stock would have performed but for some event, a financial economist may predict this by performing a regression analysis. This regression analysis might relate an investment in the firm's stock to an investment of the same size in a portfolio of stocks in the same industry or in the market.²

The regression analysis also provides other relevant information such as the statistical significance of the relation among the variables, the degree of explanation afforded by the equation, and the ability to construct confidence intervals around the estimate. Hence, the technique not only provides predictions but also explicitly describes the strength or stability of the predictions.

Assume that an expert has constructed an equation that models the sales of Firm A as a function of total industry sales. Now the expert would like to know whether the sales of Firm A relate to the total industry sales, that is, whether this variable helps explain the movement of the firm's sales. By examining the *t*-statistic, an economist can ascertain whether the variable has significant explanatory power. The economist can also check the coefficient of determination (often called the

R-squared) to measure the amount of the change in the firm's sales explained by the total industry sales.

Although regression analysis produces an unbiased estimate, certain data relations can occur that obscure or overemphasize the estimates. The most common include heteroscedasticity, autocorrelation or serial correlation, multicollinearity, and nonlinear relationships. (See Pindyck and Rubinfeld (1991) and Chapter 7 for more discussion on regression analysis.)

(b) Market Definition. While market definition most often relates to antitrust analysis, it may arise in cases such as breach of contract or patent infringement or any case where the measure of damages equals the plaintiff's lost profits (or the defendant's ill-gotten gains). Analysis of the relevant market divides into two areas: the product market and the geographic market. In defining the relevant product market, one must include not only the specific product in the case at hand but also those products that consumers may substitute (demand-side substitution). One must also identify both the firms that currently make the relevant product(s) and the firms that could switch to manufacturing the relevant product(s) (supply-side substitution). Similarly, in defining the geographic market, one must include not only the areas the firms that make the relevant products currently serve but also the areas from which firms would ship if a supracompetitive (or patent monopoly) price were imposed (Posner and Landes, 1981).

Economists can test empirically for a market definition in a way that accounts for relevant factors. First, they can estimate the change that will occur in the quantity sold of a product if the price of that product changes (own-price elasticity). Second, they can estimate the change in the quantity sold of a good when the price of another good changes (cross-price elasticity). These estimates offer useful tools of market definition. For example, if a 10 percent increase in the price of Product A produces a 20 percent decrease in the quantity sold of Product A and a 15 percent increase in the quantity sold of Products B and C, a market defined as Product A alone may well be too narrow, and one should consider including Products B and C in the market definition. On the other hand, if a 10 percent decrease in the quantity sold of Product A has no (or only a small) effect on the sales of Products B and C, then one could define the relevant market as Product A alone.

Economists often empirically test the geographic market by correlating the prices of the products in different areas. Correlation analysis measures the strength of the relationship between two variables when analysts cannot identify one variable as the cause of the other(s).³ Economists have found that the prices of products that share the same geographic market will tend to correlate strongly. That is, if the price in Area A and the price in Area B tend to move together, they probably share the same geographic market (Stigler and Sherwin, 1985).

(c) Price Theory. Price theory offers another area of economics important for litigation. By observing prices over long periods of time, economists have discovered that certain markets behave in certain patterns, most commonly competitive (many sellers of a good and its close substitutes), monopoly (one seller of a good without close substitutes), oligopoly (few sellers of a good and its close substitutes), cartel (a group of firms acting in concert), and monopsony (a firm with monopolistic buying power). For example, economists have observed that in a

competitive market, firms cannot raise the price significantly above the competitive level without decreasing their total revenues and profits, whereas a monopolist who can prevent entry can raise the price profitably. Although most people associate price theory with antitrust and regulation cases, it may apply to any case where an expert must estimate a firm's behavior in the absence of the injurious conduct. For example, in a breach of contract case, the tools that price theory provides may help identify subsequent sales as replacement sales for the breached amount or additional sales that would have occurred anyway.⁴

(d) Market Risk. Many empirical studies require consideration of capital market risk.⁵ For example, in a present value analysis, an expert discounts cash flows to a specific date, and the discount factor the expert uses should reflect in some cases the market and industry effects of each period. Economists can estimate the appropriate discount rate.

Financial economists often use the Capital Asset Pricing Model (CAPM) to estimate the appropriate discount rate (see Chapter 8). CAPM defines the return of a firm as the risk-free rate of return (usually measured by the return on short-term T-bills) plus the difference between the return on the market and the risk-free rate of return (otherwise known as the risk premium) times the firm's beta (the measure of the firm's market risk) (Brealey and Myers, 1996, p. 180). A financial economist using the CAPM could develop a discount factor for the present value analysis that would incorporate not only the effects of cash flows occurring in different time periods but also the return that the market and the specific firm experienced. Hence, an expert could more precisely measure what an expected cash flow occurring in Time Period 6 would equal in Time Period 0.

Financial economists also deal with the effect of leverage (or debt). The presence of debt that a company must pay before the shareholder receives any return makes the shareholders' investment relatively riskier. The discount factor for a firm's assets will therefore differ from the discount factor for the firm's equity by the amount of risk represented by debt (Brealey and Myers, 1996, pp. 213-217). The financial economist understands this distinction, how to change one to the other, and which one will apply to the specific case.

3.3 PARTICULAR STRENGTHS OF ACCOUNTANTS. The accountant has strengths that others would find difficult to duplicate. These include the understanding of generally accepted accounting principles (GAAP), the way in which management uses the underlying data to produce a financial statement (whether for internal or external use), cost estimation, effects of income taxes, and how best to present the results in an understandable fashion.

(a) GAAP. Only one trained in accounting can understand the generally accepted accounting principles used to prepare accounting statements for public use. Much empirical data used in lawsuits come from these statements. If the economist or other expert does not understand a number's derivation or what it represents, that expert might base an empirical study on a set of assumptions that does not apply to the case, or might use the wrong data altogether. The following highlights some of the areas nonaccountants understand the least.

One of the most difficult areas involves consolidation of financial entities. After a parent consolidates a subsidiary, an economist may need an accountant's expertise to unravel the consolidation to measure unreported items: the amount the parent paid for the subsidiary, the book value of the subsidiary's assets prior to consolidation, the amount of goodwill on the subsidiary's books prior to consolidation, the intercompany transfers, the effect of the subsidiary's being a foreign operation, and so forth. The accountant must understand these items for both the pooling and purchase methods. Consolidations become even more complicated when the parent's ownership equals less than 100 percent.

An accountant can explain valuation bases of assets under generally accepted accounting principles. An economist may plan to use balance sheet data over a period of years to perform an empirical study. An accountant can explain when valuations use historical cost and market values. For example, when a case involves a firm's holdings of marketable securities, the accountant may have to ascertain whether the financial statements use a cost or market basis and whether a continuous series of data valued on the same basis exists.

When studying a firm's sales, an accountant may need to explain the effects of revenue recognition at times other than the time of sale. This becomes especially true when the firm has long-term construction contracts, installment or consignment sales, or special-order merchandise.

Inventory presents two difficulties: the valuation of inventory (acquisition cost, current cost, lower-of-cost-or-market, and standard cost) and cost flow assumptions (specific identification, LIFO, FIFO, and weighted average). The economist untrained in accounting will not typically know that although LIFO (last in, first out) measures the cost of goods sold at current costs, it presents inventory amounts on the balance sheet unrelated to current costs. Even an economist who understands the basics of LIFO may not know how the intricacies of dollar value LIFO, gross margin method, and dollar value retail method LIFO affect accounting data. Regarding capital assets, the accountant understands the differences in the valuation of purchased and self-constructed assets, as well as the valuation of costs subsequent to acquisition (e.g., repairs and maintenance, moving, replacement and improvement, and additions). The concept of *depreciation* causes confusion because the term has different meanings for economists and accountants. To the economist, depreciation means the decline in an asset's value in a given period, which decline results from reductions in the asset's value caused by (1) physical use and (2) obsolescence offset by unrealized holding gains (or further reduced by unrealized losses). To the accountant, depreciation means, simply, a process of cost allocation, which assigns cost to periods of use. Over the life of the asset, the accountant will write down the asset's cost to salvage value through some systematic process unrelated to periodic change in value. In contrast, the economist will track the market value of the asset, calling declines in market value *depreciation* and increases, *appreciation*.

Economists often do not understand contra accounts. Although assets such as accounts receivable and property, plant, and equipment have contra accounts, each contra account has a different purpose. The allowance for doubtful accounts helps estimate the recoverable value of accounts receivable, but the contra account *accumulated depreciation* serves a different purpose. Moreover, an economist may need to know that although tangible assets have separate contra accounts, intangible assets

need not have such accounts. Yet the nonexistence of a contra account does not mean that firms do not amortize intangible assets in much the same manner as they depreciate tangible assets.

An economist who has mastered the relatively simple process of accounting for marketable securities may not understand the methodology used for investments in securities, especially when an equity investment provides its owner significant influence. Generally, one uses market values to value an interest in a firm's equity securities as part of a portfolio in financial statements. In some cases, however, the investor may use the equity method. The balance sheet figure for an investment reported by the equity method does not equal either the cost that the investor paid or the investment's market value. Instead it represents a mixture of the original cost to the investor increased by the investor's share of the firm's earnings retained since the time of the investment. An economist, moreover, may not know that this investor's income statement will report revenue equal to the increase in this investment without the firm's necessarily receiving cash from it.

A bond is another financial instrument with complicated accounting conventions that may play an important role in empirical studies. The reporting requirements differ depending on whether the bond is an asset (investment) of the firm or a liability (debt). An economist studying a firm's bond investments may not realize that the amount listed on the firm's balance sheet equals the present value of the bonds' face value and the expected interest payments (evaluated at the effective interest rate on the purchase date, unadjusted for subsequent interest rate changes) and not the face value of the bonds. Furthermore, the income statement's interest expense for the bond debtor probably does not equal the interest paid.⁶ When studying bond discounts and premiums and their amortization, an economist may need an accountant's help to calculate the market or face value of what a firm owes or even owns.

Pension plans comprise yet another source of mystery to a nonaccountant; their terminology includes such phrases as *normal cost*, *sweetening*, *actuarial liability*, *vesting*, *defined benefit*, *defined contribution*, *fully funded*, *partially funded*, *contributory*, and *noncontributory*. For an economist, the most important fact concerning pension plans and other postemployment benefits may be that a firm's obligations may not appear—or at least not appear in total—anywhere in the financial statements.

(b) Understanding Uses of Accounting Data. An accountant understands how firms record their underlying data for internal purposes and how firms adjust these data to create financial statements for external use. In fact, many firms simply have two different accounting systems—one for financial reporting and one for assisting in managerial decision making. The financial accounting system contains the information for preparing reports intended for people outside of the firm (e.g., shareholders, banks). The managerial or decision accounting system, on the other hand, provides more detailed information for managers or other decision makers within the firm. Managerial or decision accounting data need not comply with GAAP and may include information on such economic concepts as opportunity costs. Accountants also understand that a term used in financial accounting may have a different meaning to economists; consider: *asset*, *depreciation*, *reserves*, *revenue*, *depreciation*, *money*. Some words, notably *cost* and *expense*, have different meanings in financial and managerial accounting.

The accountant may use knowledge of the financial data to restate or recreate lost financial records. For example, the issue in litigation may relate to only one division or one product line of a firm. An accountant would probably use internal data to ascertain which income streams and assets belong to the specific entity or product line.

The accountant's understanding of underlying data also becomes critical when analyzing overhead or common cost allocation. An accountant preparing an internal report on a division's profitability may have allocated some corporate overhead costs. The expert witness, on the other hand, may need to know a division's actual overhead expenditures. An accountant can ascertain exactly what overhead costs to include in the witness's study. For example, an accountant preparing an internal division profit report may have attributed one-fifth of total overhead to the division because the division sales were one-fifth of total sales. The litigation study, however, may include only the salary of the division's vice-president, because the remaining corporate staff worked on other divisions.

Most accountants understand the issues of transfer pricing and the various methods firms use to ensure that the overall effect of buying decisions is to earn profits for the firm as a whole (not necessarily for a single division). In many litigation studies, one may wish to use the market price as the transfer price, particularly when the case focuses on a single division. Here accountants can use their expertise to correctly restate transfer prices at market prices.

Some of the litigation studies that economists and accountants perform benefit from cash flow analyses (e.g., the failing-firm analysis in a merger context). Most economists have little experience understanding statements of cash flows, particularly those that use the indirect method for presenting operating cash flow. Accountants can modify historical financial statements to create a cash flow statement for a division or a single product line.

(c) Cost Estimation. Cost estimation requires an understanding of the underlying data. Often expert witnesses need to identify which costs vary with production or sales and which costs remain fixed. The accountant must always understand the data needed for the expert's study. For example, if the case requires an analysis of incremental costs, the fixed and variable cost definitions may differ from those used in financial reports. Thus, a study of whether the company made more (or lost less) entering into a new market than it would have otherwise may require that the accountant consider the cost of new equipment purchased for this expansion as incremental even though the accountant normally views such costs as fixed. Economists and accountants rarely think about the distinction between marginal costs and incremental costs. Economists more often use the former construct, and accountants, the latter.

(d) Income Taxes. In many litigation studies, the expert must consider the effects of income taxes. Although economists know when to consider taxes, they generally have no expertise in calculating the tax effects. The accountant should clarify whether the economist wants to use the average tax rate, the marginal tax rate, the effective tax rate, or even the marginal effective tax rate. For example, a firm's weighted-average cost of capital calculation includes the marginal corporate tax rate, whereas a firm's adjusted present value uses the effective tax rate (Brealey and Myers, 1996, pp. 518, 528).

(e) **Presentation of Analysis.** Finally, an accountant can assist an economic expert in presenting a litigation report or testimony. Often an economist can best present findings to the court as pro forma financial statements that an accountant has constructed. Economists make certain assumptions or estimates in their studies and may need to illustrate how these different assumptions or estimates affect the outcome. A sensitivity analysis presented by an accountant that slightly varies the assumptions in several studies may allow the parties to appreciate which assumptions matter most.

3.4 SPECIFIC AREAS OF INTERACTION. The remainder of this chapter discusses three areas of interaction in litigation between accountants and economists: lost profit measurement, antitrust analysis, and securities laws analyses. Moreover, because other chapters in this book discuss these topics at length (e.g., Chapters 5, 17–20, and 26), this chapter focuses primarily on the economic implications of the analysis that a litigation expert may encounter.

(a) **Measurement of Lost Profits.** Whether the plaintiff has identified the cause of action as breach of contract, copyright or patent infringement, or violation of antitrust laws, damages usually equal the difference between the profits that the plaintiff would have realized but for the defendant's actions and the plaintiff's actual profits. Put differently, the general damages measure equals incremental sales (or revenues) less incremental costs. Although one may measure lost profits in many ways, most measures combine the knowledge of business and financial records with economic assumptions about the relevant industry.

(i) *Incremental Sales or Revenues.* In a lost profits study, the analyst must first compute the amount of lost revenues or sales units that the defendant's actions have caused. Analysts use four common approaches to measuring this amount: (1) before-and-after, (2) forecast of sales, (3) yardstick, and (4) market share.

The before-and-after approach compares the plaintiff's sales level before the defendant's wrongdoing with the plaintiff's sales level after the defendant's wrongdoing; the difference between the two levels represents the lost sales. This approach implicitly assumes that only the defendant's wrongdoing affected the plaintiff's business volume; otherwise the volume would have been the same. This approach, however, may underestimate lost sales for a plaintiff whose sales were increasing prior to the defendant's actions. Conversely, if the plaintiff's business was declining during the before period, such an assumption may overestimate lost sales. To effectively use such an approach, an expert often will include a market analysis in the lost profits study. For example, an industrial organization economist might characterize the industry as mature and stable during the period under question, indicating that the plaintiff's sales level probably would have remained unchanged but for the defendant's actions.

Instead of the before-and-after approach, an expert might forecast but-for sales by using a variety of tools such as regression (or other statistical) analysis and then subtracting the actual sales to estimate the lost sales. With this approach, the expert's model (or equation) must adequately predict the sales and use a control period (over which the equation is estimated) that does not contain events that would bias the results; also, the regression equation must not contain biases such as het-

eroscedasticity, autocorrelation, or other similar factors.⁷ The model should also consider all important industry factors that affect the sales of the plaintiff's products. For example, the price of oil may affect the sale of products used in constructing oilrigs. The omission of a significant factor may invalidate the expert's results or make these results seem less credible to a judge and jury. An economist can help ensure that the damages study considers all relevant factors and that the model includes the significant ones.

A third common measure is the yardstick approach, in which the expert gathers an index of firms similar to the plaintiff's firm and compares the plaintiff's performance to the index's performance. This approach assumes that but for the defendant's actions the plaintiff would have performed as well as the yardstick. Underlying biases in the data, however, can invalidate this index approach. A plaintiff firm that is small or large relative to the index firms may lead to inaccurate results. For example, if a large plaintiff firm lost market share because of the defendant's wrongful conduct, small firms that acquired those shares might appear to be growing even if the market size remained constant.

In the fourth common measure of the plaintiff's lost sales, experts consider the plaintiff's market share during the period prior to the defendant's wrongdoing. Here the expert must not only define the relevant market but also ensure that the market remained somewhat stable during the relevant time period. Numerous entrances or exits of competitors could undermine the use of this measure. Also, the analysis should examine the trend of the plaintiff's market share, because if the plaintiff's market share varies greatly over the period before the defendant's actions, this measure may be unreliable. As discussed previously, many economists understand such market definition and structure analysis.

In some breach of contract cases, the expert might start by assuming that the amounts in the breached contract represent the lost sales. The next step ascertains whether actual sales during the period of breach represented additional sales that would have occurred anyway or were replacement sales for the breached amount.

For example, with a perfectly competitive market for the plaintiff, the expert should assume that the plaintiff sells at the level justified by cost considerations and capacity. Even plaintiffs who could sell more would not unless they were willing to use higher cost capacity or to invest in extra capacity, a consideration we ignore for now. In other words, the seller can get all the customers it wants. Now a customer breaches the contract. In a perfectly competitive market, the expert should assume that the seller could find another customer to take the breaching buyer's amount. The only compensation owed the plaintiff would equal the difference in the two buyers' prices, if any such difference existed (Goetz and Scott, 1979). On the other hand, assume that the market has long-term contracts and few buyers and the seller has extra capacity. Now one of the plaintiff's buyers breaches, and subsequently the plaintiff makes sales to a new buyer (or additional sales to a present buyer). Here one may argue that the new sales do not replace the breached amount and that the court should consider the full amount of the breached contract as lost sales (Goetz and Scott, 1979). Thus, experts who do not first analyze the plaintiff's market may find their conclusions vulnerable to close scrutiny.

In addition to the direct damages owed to the plaintiff, consequential damages may also occur. Economists find this a natural concept. If damages awards purport to restore the plaintiff to the position it would have been in but for the defendant's

actions, the damages claim must encompass every phase of the plaintiff's business affected by the defendant's actions. For example, a buyer breaches a contract for Product A, which is a joint product with Product B, and the breach causes the plaintiff to alter its production of Products A and B. In this case the breach could also cause damages related to Product B. Consequential damages may also arise when a breach affecting the sales of a complicated machine also affect the subsequent sales of replacement parts or maintenance service for the machine. To ascertain whether consequential damages have occurred whenever the plaintiff has an integrated facility requires that the economist conduct the same type of market definition and structure analysis discussed previously not only for any primary product but also for the joint or coproducts.⁸

An expert's most difficult proposition to establish, of course, will be the lost sales or revenues for a newly established or never-established business (see Chapter 6). Courts now hold that such businesses can recover damages, provided they have been proven with "reasonable certainty" (Dunn, 1992, Vol. 1, pp. 280-292). As a result, the expert may need to ascertain the plaintiff's market structure. If the plaintiff's market contained many small firms or a few large ones, an expert should know where a firm of the plaintiff's expected size would fit along this spectrum. If the plaintiff would have been a small competitor in a market composed chiefly of large competitors, the plaintiff's expert has to prove that the plaintiff still could have competed in such a market. Experts also need to consider ease of entry and the stability of existing firms in the industry. If the plaintiff asserts that its firm would have had an advantage over other competitors because of a patent or other new process but for the defendant's actions, the expert must make some reasonable assumption regarding how long the benefits conferred by the patent or new process would last.⁹ Regardless of the method used to estimate the plaintiff's lost sales, the expert should have some economic underpinning of the assumptions.

(ii) *Incremental Costs.* After estimating the amount of lost sales, the expert must subtract the costs the firm would have incurred to achieve these revenues. Such an analysis may consider many different cost measures: marginal, incremental, variable, average, and direct. Marginal cost is the cost of producing one additional unit. *Incremental cost* refers to the cost of an unspecified number of additional units or of a new product line. *Average cost* equals the total cost divided by the number of units produced. *Variable costs* change as the activity (or production) level changes. Direct costs are the costs of the direct material and direct labor incurred in producing a product. These definitions come from Stickney and Weil (2000, pp. 878-880). The expert must decide which cost measure pertains to the particular case. For example, a variable cost estimate may apply only over a certain range of production (called the relevant range). If the estimated lost sales units would increase the production level outside the relevant range, then the use of the variable cost estimate may be incorrect.

The relevant cost measure may vary, of course, depending on whether the business is expanding or contracting.¹⁰ If the business is expanding and the amount of lost sales units would take production past the plaintiff firm's present limits, the expert should consider including the capital costs of investment in new capacity or new equipment as a cost in the lost profit analysis. The expert using incremental

costs should include such costs and should also make reasonable assumptions concerning the timing of the investments.

Regardless of the measure used, the expert should consider the time period over which to measure costs. Over a long enough time period almost all costs vary, and over a short enough time period costs remain fixed. Sometimes the case has an obvious time period (e.g., the duration of the defendant's wrongdoing). In other cases, the expert generally will find that as the appropriate time period shortens, the expert should subtract fewer indirect cost items from the lost sales revenues to estimate lost profits. In any event, the experts who ignore this issue may get the wrong answer even though they have correctly made all other assumptions in the analysis.

An expert estimating costs for a firm that would have sold more units but for the defendant's actions should consider the possibility of economies (or diseconomies) of scale. With a large number of lost units, the plaintiff could achieve large cost savings at that production level. A study using only current costs could underestimate the plaintiff's damages. Similarly, a startup firm may have a higher cost structure because of learning curve effects than a firm that has been in business for some time.

(iii) *Other Considerations.* If an expert uses dollar amounts in his regression analysis and the analysis covers a multiyear time period, the expert may deflate the underlying data to constant dollar values prior to performing the analysis. Failure to perform the analysis in real, instead of nominal, terms sometimes will create or accentuate a trend. Having decided to deflate the underlying data by an index, the expert should choose an appropriate index. Deflating different variables often requires the use of more than one index.

Suppose that a buyer breaches the contract before, or shortly after, the seller has begun performance. Should the seller receive its expected lost profits or just the costs it incurred in reliance on the buyer's performance? The solution may depend on the details of the particular situation. A contract formed in a competitive market with symmetrical information between the buyer and seller may call for expectation damages. Otherwise one may find that although expectation damages present a solution of the problem of inefficient breach, reliance damages present a solution to inefficient purchase (Friedman, 1989).

As experts complete their lost profit calculations, they should decide whether to calculate the damages on a pretax or after-tax basis. Because the government taxes a lost profits award, some experts prefer to calculate the award on a pretax basis.¹¹ This advice, however, may lead to an over- or underestimate of damages by its failure to recognize changes in tax rates. Alternatively, one could calculate the award on an after-tax basis and then gross up the damages amount by the current tax rate (i.e., divide the after-tax damages by one minus the current tax rate). For example, suppose the plaintiff would have made \$100 on a pretax basis during Year 1 and had it generated those funds in Year 1 it would have paid \$46 in federal income taxes. (This example ignores present value and state tax issues.) Thus, the plaintiff would have had \$54 more but for the defendant's wrongdoing. The plaintiff's case goes to trial in Year 7, after the marginal corporate federal income tax rate has dropped to 34 percent. If the court awards the plaintiff the pretax \$100 in Year 7, it will pay only \$34 in federal taxes and on an after-tax basis will have \$66, \$12

more than the amount needed to make it whole. On the other hand, had the award been made on the grossed-up amount of the plaintiff's lost profits on an after-tax basis, the plaintiff would have received \$82 ($= \$54 / (1 - 0.34)$), paid \$28 in taxes, and have \$54 left. In this example, the plaintiff would have benefited had the damages award been paid on a pretax basis. The results go in the opposite directions if the tax rate had increased.

An expert who has used a discounted cash flow analysis to evaluate the plaintiff's lost profits will need some interest rate to bring those cash flows forward to the time of the trial from the base point of the analysis. (This assumes that the jurisdiction or particular cause of action permits prejudgment interest—see Chapter 9.) At the very least, this interest rate should reflect the value the plaintiff's funds have lost owing to inflation. This measure, however, will not compensate the plaintiff for the opportunity costs of the use of its funds. This refers to the fact that had the plaintiff not been denied the use of the damages amount, it would have invested it in some enterprise (perhaps in stock, perhaps in the performance of the plaintiff firm) and would have received a return on this amount.

Some experts suggest using the risk-free rate (Fisher and Romaine, 1990) to measure prejudgment interest. Other experts suggest using the plaintiff's cost of capital, that is, a measure of the opportunity cost to the plaintiff (of course, at this point the defendant may argue that consequential damages are being sought). The defendant's borrowing rate, however, may offer a better measure because it regards the plaintiff's claim as an investment (albeit an involuntary one) in the defendant.¹²

(b) *Antitrust.* Antitrust law heavily relies on economic analysis. In both liability and damages issues, economic analysis plays such an important role that any study failing to consider the economic aspects of the case would become virtually useless in court or administrative hearings. Performing certain calculations has no meaning unless the expert knows what economic concepts those numbers represent and how they fit into the present antitrust framework.¹³

(i) *Mergers.* The Department of Justice (DOJ) aims to prevent mergers that create or enhance market power. *Market power* is the ability of a firm (or group of firms) to raise prices above the competitive level for a significant time period. The DOJ has stated that a price increase of 5 percent for 1 year in most contexts will constitute a "small but significant and nontransitory" increase in price.¹⁴ The firm (or group of firms) possessing market power can raise prices without losing so many sales that the price increase becomes unprofitable by restricting output (Posner and Landes, 1981).

Merger analysis first defines the relevant product and geographic markets. As discussed previously, the study must include not only firms directly competing with the parties involved in the merger but also firms producing substitute products and firms that would enter the market or expand their current output should the merged firm impose a supracompetitive price.¹⁵ The DOJ defines the relevant market as all firms that, should they act in concert, would be able to profitably impose a "small but significant and nontransitory" price increase.¹⁶ Note that if the analysis excluded firms that make substitutes for the merged firms' product, a restriction in output resulting in a supracompetitive price would appear on paper to be profitable. In reality, however, because customers would switch to the compet-

itively priced substitutes, the supracompetitive price level would not be profitable. This same reasoning applies to the omission of firms that would enter the market if a supracompetitive price were imposed.

Having defined the relevant product and geographic markets, the expert should now measure the concentration within the markets to ascertain whether the transaction will fall within a safe harbor under the DOJ's guidelines. A common concentration measure (also cited in the DOJ's guidelines) is the Herfindahl-Hirschman Index (HHI). This measure first squares the percentage share of each firm and then compares the sum to preestablished cutoff points.¹⁷ The comparison involves judgment, however, even in a calculation as simple as this. One can measure market shares on the basis of sales (either dollars or units), shipments, production, capacity, or reserves.¹⁸ The correct measure depends on the economic facts of each case. Once one computes the HHI for the correct market, one knows that the DOJ will not likely challenge the transaction if the postmerger HHI is below 1000, or if the postmerger HHI lies between 1000 and 1800 and the merger would produce an increase of less than 100 points, or if the postmerger HHI exceeds 1800 and the merger would produce an increase of less than 50 points.¹⁹

Even if the HHI concentration measure suggests that the merger could reduce competition, other considerations exist. The DOJ primarily challenges mergers out of fear of collusion—that is, fear that the number of firms will be so few that they could easily act in concert as one giant firm. Recognized factors exist, however, that facilitate or prevent collusion among a group of firms. Factors that facilitate collusion include: scarcity of firms, barriers to entry, homogeneous product, demand inelasticity, level of industry profits, industry social structure, and sealed bidding (availability of price information). Factors that make collusion difficult include: irregularity and infrequency of orders, high fixed costs, low transportation costs, frequent technological change, and variations in production costs (Brozen, 1982; Hay and Kelley, 1974). An expert may show that even though one might normally consider the concentration levels within the relevant market to be high, collusion is unlikely; a firm might prefer the gains from cheating on a collusive agreement²⁰ because of the presence (or absence) of the factors discussed.

The expert should also consider whether reasons exist for this merger other than the purchase of a competitor's exit. The expert should investigate whether the merger will increase output. If the relevant market has high concentration, an expert may consider whether allowing the merger of the third and fourth largest firms would produce an effective competitor to the industry giants that are the first and second largest firms. The expert should not neglect, moreover, to perform efficiency studies that will document economies of scale and scope between the merging firms.²¹

Finally, when the expert estimates damages in cases alleging that a merger violated the antitrust laws, the expert must causally link his damages measure to the anticompetitive acts cited in the complaint. In *Brunswick Corp. v. Pueblo Bowl-o-Mat, Inc.*, the plaintiff's damages measure was the profits it would have earned had the defendant not acquired certain bowling centers and these centers had gone into bankruptcy instead. The Supreme Court vacated the lower court's judgment for the plaintiff on the ground that this damages measure bore no relation to the antitrust injury of which the plaintiff complained. The plaintiff would have suffered these injuries had the acquired centers obtained refinancing or been acquired by a

nonobjectionable party (*ibid.*, pp. 487-488). Thus, an expert on damages issues should show that the damages relate to those acts that injure competition, not merely to acts that injure a competitor.

(ii) *Failing-Firm Defense.* The failing-firm defense relates to merger analysis. However, because it involves such extensive financial analysis, we discuss this defense separately. The economic premise for this defense states that the DOJ should allow an otherwise objectionable merger if the firm to be acquired would otherwise go out of business. In this situation, the law prefers a sale to a dominant firm over removing capacity. To use this defense, the owners of the firm or division to be acquired must have sought and found no other buyers who would continue to run the business. The best financial analysis will nonetheless fail if a less objectionable buyer emerges.

Assuming that the merger meets the shopping requirement, the expert must investigate whether the firm or division to be acquired had such large losses that the present owners will close it rather than continue to incur these losses. First, one must examine the future of the firm or division and estimate whether the future will differ from the recent past. Is competition increasing or decreasing? Is demand increasing or decreasing? Do the firm's competitors have a cost advantage that the failing firm cannot duplicate? If a market analysis demonstrates that the future will not diverge from the past, an expert may find the following rate-of-return experiment useful: Using actual cash flows for a five-year period and assuming that everything that has transpired within this time period had been known five years ago, would the firm's owners have elected to continue operating the business, or would they have chosen to exit the business?²²

We use a cash flow rate of return analysis rather than accounting returns because cash flows more accurately reflect whether firms generate sufficient funds to cover variable costs. In the short run, a firm that generates enough cash to cover its variable costs will be able to, and may choose to, remain in operation. The accounting algorithm labels some cash outflows as *operating expenses* and others as *capital expenditures*. It deducts operating expenses from each year's income immediately but depreciates capital expenditures according to a schedule chosen by the accountant. As a result, the accounting return on investment will reflect some cash expenditures made in previous periods and will not reflect some made during the current period. In addition, the reported accounting book value of the assets may not accurately reflect the asset's market value.

One can avoid the problems associated with using the accounting definition of return on investment by using a cash flow internal rate of return (IRR) that incorporates the market or salvage value of the assets. The IRR is the interest rate "that will make the present value of cash proceeds expected from an investment equal to the present value of the cash outlays required by the investment" (Bierman and Smidt, 1980, p. 30). In other words, the IRR is that discount rate that makes the net present value of the project equal to zero (Brealey and Myers, 1996, p. 92).

The expert can compare the firm's IRR to the rate of return the firm could have earned elsewhere with investments of similar risk to ascertain whether the firm would have chosen to exit the business at the beginning date of the analysis had the future been known. If the firm's IRR equals the firm's return on an alternative investment of similar risks, the firm neither profited nor lost from its operations. If the IRR is less than the firm's return on alternative investments of similar risks,

then the firm would have been better off withdrawing.²³ In the extreme case, if an existing business has a cash flow with a negative IRR, the firm not only made less than it could have earned elsewhere, it diminished the value of its original investment as well.²⁴ In such a case, obviously the firm would improve its position by shutting down the business and selling out rather than running it and continuing to generate negative cash flow.

To calculate the IRR of a business, the expert should measure each year's cash flow. Generally, an expert will adjust a firm's financial statements to a cash basis by, for example, adding noncash items, such as depreciation, back to income. The expert will also need to subtract the actual cash spent on capital investment (net of their tax effects). Although the expert will not include any financing effects in the analysis (e.g., interest payments on firm debt), the expert should include a charge for the change in the level of working capital used in operations. The expert should do the analysis on an after-tax basis because tax effects, such as the use of one division's losses to offset the profits earned by another division, may alter the results of the analysis. The expert may also revise the analysis to remove the effects of extraordinary events, such as investment in a major project or the effects of a recession, to disprove the notion that the underlying business is sound but that a large investment in an unsuccessful project or economic conditions that no longer exist caused the firm's difficulties.

The most difficult part of the IRR analysis requires estimating the amounts of the beginning and ending flows. Because the expert needs to ascertain whether the owners would have abandoned the firm had they known the future, the beginning and ending flows should reflect what the firm could expect to have received upon abandonment five years ago and what the firm could expect to receive upon abandonment at present. In other words, what was the value of the assets at their next best alternative use five years ago outside the industry in which the assets are currently employed, and what is that value today? The expert should ensure that the analysis includes all unrecorded liabilities. For example, large unrecorded pension or environmental cleanup costs may compel the owners to continue operating with minimum losses rather than pay the large lump sum required immediately upon abandonment. Again, one should calculate these beginning and ending flows after taxes, because the owners can deduct losses associated with writing down assets from the firm's other taxable income. Finally, if the price exceeds the acquired firm's salvage value, the expert may want to provide an analysis of the acquirer's price (e.g., relating price to cost savings that will accrue to the acquirer because of efficiencies). Otherwise, questions such as why the acquirer is paying more for the whole business than the sum of the values of its individual net assets may undermine the entire analysis.

(iii) *Predatory Pricing.* Predatory pricing is pricing a firm's products below cost with the intent of driving one's competitors from the market and thereafter raising the firm's prices to a supracompetitive level.²⁵ Predatory pricing constitutes an offense under Section 1 (unlawful restraint of trade) and Section 2 (monopolization or attempt to monopolize) of the Sherman Act and Section 2(a) of the Robinson-Patman Act (destroying competition or eliminating a competitor).²⁶ Although many courts agree with the stated definition, commentators disagree on the appropriate cost measure to use to calculate below-cost pricing in an antitrust analysis.²⁷

Professors Areeda and Turner propose the most widely used cost standard in their "Predatory Pricing and Related Practices under Section 2 of the Sherman Act" 88 *Harv. L. Rev.* 697 (Areeda and Turner, 1975) and later published as part of *Antitrust Law*, para. 711-722 (Areeda and Turner, 1978).²⁸ The authors set their ideal nonpredatory standard at a price above reasonably anticipated short-run marginal costs. They recognize that analysts seldom have marginal cost data, however, so that a first approximation price above the reasonably anticipated average variable cost should be presumed lawful.²⁹ Nevertheless, courts have held other cost measures relevant to the question of whether the defendant engaged in predatory pricing.³⁰ The details of the particular case may determine the relevant cost analysis. Although an average variable cost analysis may be appropriate for a firm already in the market, it may be inappropriate for a new entrant who may have to engage in promotional pricing to gain customer loyalty, a capital asset that a long-time competitor already possesses.

Even when the analyst has decided on the relevant cost measure, important aspects of the analysis still remain. For example, if the predatory claims relate to a single division (or product) of a multidivision (multiproduct) firm, the expert needs to consider joint costs.³¹ The time frame over which the expert analyzes the firm's costs as fixed or variable becomes important: The shorter the time period, the fewer the variable costs. The expert should consider whether to analyze costs that vary as production rises and falls within some output range or whether to measure costs that vary as production falls to zero (going-concern versus shut-down analysis). For a firm that has large costs associated with producing one unit that do not increase with the production level (zero-one costs), the level over which costs are measured as variable could determine the case.³²

Important as cost estimation may appear in predatory pricing analysis, market analysis also has an equally, if not more, significant role. A firm engaging in successful predatory pricing and its anticompetitive effects must be able to recoup its losses; that is, it must obtain and retain market power.³³ If the firm cannot absorb the market shares of its competitors that have failed, demand will remain for the surviving competitors with higher prices, and the firm will have injured itself to no avail.³⁴ Similarly, if barriers to entry do not exist, the firm that has driven all present competitors from the market by predatory pricing will soon find it has yet another set of competitors and that it cannot maintain supracompetitive prices for the period of time needed to recoup the losses it has inflicted upon itself.³⁵ If the plaintiff and defendant compete along their full product lines, the analyst should not apply a cost test to a single product line, because competitive injury will not occur in the relevant market even if the seller priced that product below cost.³⁶

(c) **Securities Laws.** Securities cases show the influence of economic analysis. Many developments have centered around fraud-on-the-market cases. In *Basic Inc. v. Levinson*, the U.S. Supreme Court cited academic studies that show that the price of a widely traded stock reflects all publicly available information about that stock, demonstrating that markets are efficient.³⁷

Accordingly, a plaintiff who can establish that a false, misleading, or omitted statement has affected the stock's price may be entitled to recover the difference between the stock's actual value and true value (i.e., the value the market would have reached had the truth about the firm been known).³⁸ The expert in such cases will consider whether the true value of the stock differed from the actual value.

Many academic empirical studies have demonstrated that movements in the overall market explain a significant portion of a stock's price movement. (Brealey and Myers, 1996, pp. 143-166; Copeland and Weston, 1988, pp. 193-240; Fama, 1976, pp. 41-132). Based on these studies, experts have constructed statistical models (regression equations) that predict stock price movements. Using stock price data from a time period prior to the period of interest, the expert may calculate the relation between the return on a particular firm and the return on a market index (e.g., S&P 500). The expert uses this regression relation (market model) and the actual market return during the period of interest to predict the particular stock's return. With a large enough difference between the actual value and the predicted value, analysts consider the firm as having experienced a statistically significant abnormal return. Moreover, some academics have advocated the use of a comparable index, in addition to an event study approach, to determine whether the true value of the stock differed from the actual value (Cornell and Morgan, 1990).

By combining the efficient market theory and the market model, experts can study the effects of information on a stock's price and ascertain whether the effects were material (Fischel, 1982). For example, the expert may compare the actual and predicted return of a firm's stock when management discloses corrective information. This comparison will help to estimate whether any abnormal declines in value occurred relative to the stock's predicted value at the time an alleged falsehood, misstatement, or omission was corrected. If no abnormal change occurs after management publicly discloses the corrective information, the information is immaterial, and the court should find no liability.

The expert can use this same methodology to quantify the amount of damages (assuming liability). For example, the plaintiff may allege that the defendant omitted certain information from an annual report and that when the defendant publicly released the information subsequently, the stock price dropped. The expert's analysis might attribute any abnormal negative returns occurring when the firm released this information solely to the release of the information and then estimate what the stock's price would have been had these abnormal negative returns occurred earlier (i.e., when the plaintiff alleges disclosure should have occurred). Under this type of analysis, the plaintiff who owns stock would be entitled to recover only if the plaintiff bought when the actual price exceeded the predicted price (or true value). On the other hand, a plaintiff who sold the stock in question could recover only if the predicted price (true value) exceeded the actual price at the time of sale. In both cases, the amount of damages relates to the difference between the actual value and the true value. See Chapters 17 through 20 for more discussion on securities litigation.

NOTES

1. We forego a detailed explanation because other chapters in this book discuss regression analysis. See also Fisher, "Multiple Regression in Legal Proceedings," 80 *Colum. L. Rev.* 702 (Fisher, 1980), for a more complete explanation of the construction and use of regressions.
2. See Section 3.4(c), "Securities Laws," for a discussion of this point.
3. If two variables (e.g., the prices of two products) are strongly correlated and one observes a change in one of the variables, one will expect to see a change in the other. If this change in the second variable moves in the same direction as the first, the variables are positively correlated. If the change in the second variable moves in the opposite direction, the variables

are negatively correlated. If a change in the first variable results in random fluctuating changes in the second, the two variables are uncorrelated and have no strong relationship.

4. See Section 3.4(a), "Measurement of Lost Profits," for a discussion of this point.

5. Capital market risk results from economywide factors that generally benefit or threaten all businesses.

6. Only when bonds are issued at par are the amounts of interest expense and interest paid the same.

7. See also Chapter 7 in this book.

8. The presence of joint or co-products in the analysis will also have implications for mitigation. Minimizing the losses for one product and minimizing a division's losses may result in two different sets of actions.

9. Most patents have a legal life of 17 years. Their effective life, however, may be less if the market has frequent technological changes or one can easily design around the patent.

10. See Chapter 7.

11. See Chapter 14.

12. Patell, Weil, and Wolfson, "Accumulating Damages in Litigation: The Roles of Uncertainty and Interest Rates," *II J. of Legal Studies* 341 (1982). Note that the defendant's interest rates used to bring the damages to present value should be the effective after-tax rate to reflect the realities of the plaintiff's alternative uses of cash. To do otherwise would have investments in damage claims grow more rapidly than real investments of similar risk. The final amount, of course, should be "grossed up" by the plaintiff's tax rate, as discussed previously.

13. See Rosenfield, "The Use of Economic Analysis in Antitrust and Securities Litigation," *1 Colum. L. Rev.* 49 (1986), for a detailed discussion of the widespread influence of economics in antitrust analysis.

14. U.S. Dept. of Justice, *Merger Guidelines*, 49 Fed. Reg. 28, 823 (1984).

15. See Section 3.2(b) for a discussion of market definition.

16. U.S. Dept. of Justice, *supra*.

17. A firm that had 10 percent of the market would have an HHI number of 100 ($10 \times 10 = 100$). A market that had 100 firms with a 1 percent share would have an HHI of 100. A market with one firm would have an HHI of 10,000 (100×100).

18. U.S. Dept. of Justice, *supra*.

19. *Ibid.*

20. See G. Stigler, "A Theory of Oligopoly," in *The Organization of Industry* 39 (1968) for a more complete discussion of modern collusion theory.

21. With economies of scale (i.e., increasing returns to scale), a firm can increase productivity or lower average costs of production by increasing production. For example, if a firm increases inputs by 10 percent and total output increases by more than 10 percent, the firm is better off with the higher production (assuming that price does not fall). With economies of scope, a firm can achieve lower costs by producing multiple goods together. For example, a firm that produced both clocks and watches might be more efficient than two firms, one of which made clocks and the other of which made watches, because the first firm could share industry-specific knowledge and machinery across both product lines (Samuelson and Nordhaus, 1992, p. 735).

22. The choice of a five-year time period is purely arbitrary. The facts of each individual case will determine the appropriate period to use. If the future appears to differ from the past, the expert will do the same type of analysis, only with projected cash flows. Of course, this experiment may not be as strong as the first because the projected cash flows are less reliable.

23. An expert may find the after-tax return on U.S. government securities to be a useful and conservative benchmark, because people may disagree on what return the firm could expect from alternative investments of similar risks. Certainly a firm that earns less than it could from investing in risk-free government securities would be better off withdrawing from its operations.

24. For example, if the IRR is -10 percent, an initial investment of \$100 will be worth only \$90 at the end of the year.

25. E.g., *Cargill, Inc. v. Monfort of Colorado, Inc.*, 479 U.S. 104 (1986); *Matsushita Elec. Ind. Inc. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 584 (1986). For those readers interested in a detailed analysis of the economic aspects of predatory pricing (and for potential expert witnesses in this area), the following are recommended: R. Bork, *The Antitrust Paradox* 144-160 (1978); Easterbrook, "The Limits of Antitrust," 63 *Tex. L. Rev.* 1 (1984). Easterbrook, "Predatory Strategies and Counter-strategies," 48 *U. Chi. L. Rev.* 263 (1981); Koller, "When is Pricing Predatory?," *Antitrust Bull.* 283 (Summer 1979); McGee, "Predatory Pricing Revisited," 23 *J. Law & Econ.* 289 (1980).

26. 2 CCH Trade Reg. Rep. 1 6500.

27. In *Brooke Group v. Brown & Williamson Tobacco*, 113 S. Ct. 2578, 125 L. Ed. 2d 168, 186 n. 1 (1993), the Supreme Court declined to resolve the conflict among the lower courts concerning the appropriate cost standard in a predatory pricing case because the parties agreed that the relevant measure of cost was average variable cost.

28. For example, *Bayou Bottling, Inc. v. Dr. Pepper Co.*, 725 F.2d 300 (5th Cir. 1984); *Arthur S. Langenderfer, Inc. v. S. E. Johnson Co.*, 729 F.2d 1050 (6th Cir. 1984); *D&S Redi-Mix v. Sierra Redi-Mix & Contracting Co.*, 692 F.2d 1245 (9th Cir. 1982).

29. P. Areeda and D. Turner, *Antitrust Law* ¶ 711d(1978).

30. P. Areeda and H. Hovenkamp, 1988 *Supplement to Antitrust Law* ¶ 711.1c E.g., *MCI Communications Corp. v. American Tel. and Tel. Co.*, 708 F.2d 1081 (7th Cir. 1983).

31. In *Marsann Co. v. Brammell, Inc.*, 788 F.2d 611 (9th Cir. 1986), the Ninth Circuit held that the relevant average variable cost is that of the items sold at the challenged price, rather than that associated with the production of the total output.

32. Remarks about cost estimation made previously in this chapter also apply here.

33. *Brooke Group v. Brown & Williamson Tobacco*, 113 S. Ct. 2578, 125 L. Ed. 2d 168 (1993).

34. *Cargill*, 107 S. Ct. at 494 n. 15; K. G. Elzinga and D. E. Mills, "Testing for Predation: Is Recoupment Feasible?" 34 *Antitrust Bulletin* 869 (Winter 1989).

35. *Matsushita*, 106 S. Ct. at 1359 n. 15. (Citing Easterbrook, "Limits of Antitrust.")

36. *Liggett Group, Inc. v. Brown & Williams Tobacco Corp.*, 748 F. Supp. 344 (M.D.N.C. 1990).

37. *Basic Inc. v. Levinson*, 108 S. Ct. at 991 n. 24. See also *Flamm v. Eberstadt*, 814 F.2d 1169, 1179 (7th Cir. 1987).

38. *Basic*, 108 S. Ct. at 991-992; *Flamm*, 814 F.2d at 1179-1180.

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OIL MARKET INTELLIGENCE

Refining Netbacks: Outages Buoy Margins

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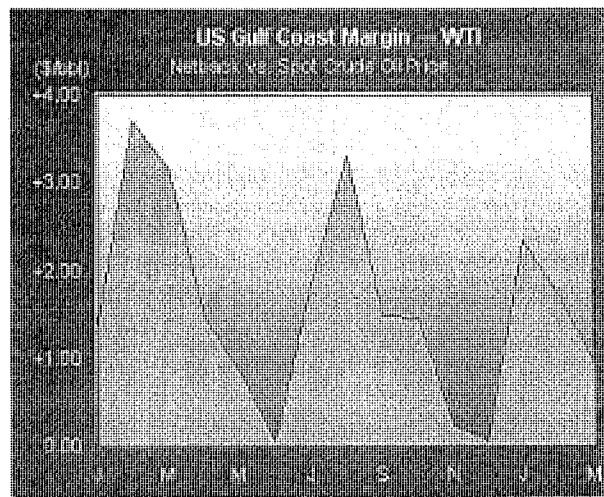
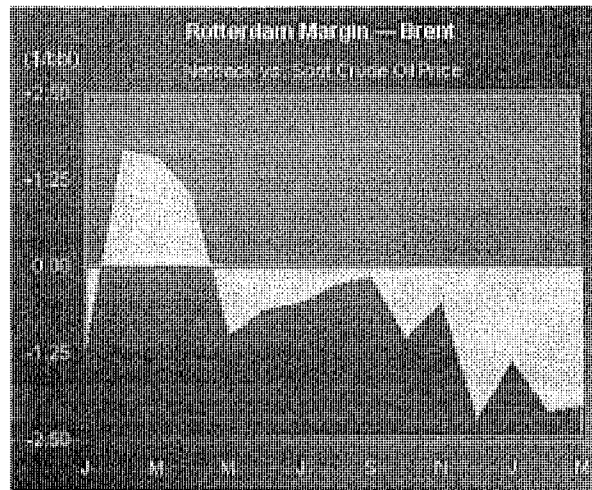
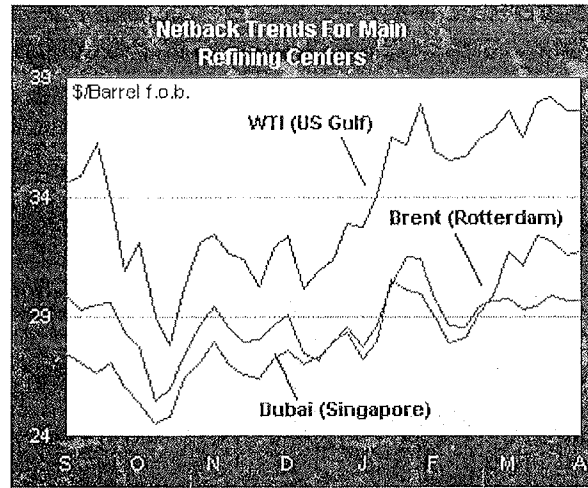
Refining fortunes continue to improve in all three key processing centers as outages -- both planned and unplanned -- crimp supplies of finished products, particularly of gasoline, in the Atlantic Basin. West Texas Intermediate is making almost \$2 per barrel in a US Gulf Coast cracker, up from just a few pennies last month. Gasoline-rich Nigerian Bonny Light and North Sea Brent are doing even better as US refiners struggle to build up summer fuel tanks while meeting the bumper gasoline demand that's arrived ahead of the peak driving season (p8). Spring turnarounds may be over, but US refiners are still having trouble bringing runs back above 90% of capacity, mainly because of a spate of unplanned shutdowns. Giant Industries' 26,000 barrels per day Ciniza refinery in New Mexico triggered another gasoline rally after a fire broke out in a gasoline unit on Apr. 8. Other plants to suffer problems in the last few weeks include Exxon Mobil's 360,000 b/d Beaumont refinery in Texas, Royal Dutch/Shell's 110,000 b/d Wilmington plant in California, BP's 460,000 b/d Texas City refinery, as well as Koch's 286,000 b/d Flint Hills plant in Minnesota and Sunoco's 90,000 b/d plant in Tulsa, Oklahoma. Since most of these unplanned outages have been on the US West Coast, refiners still operating there have enjoyed margins some three times higher than their poorer cousins in the East.

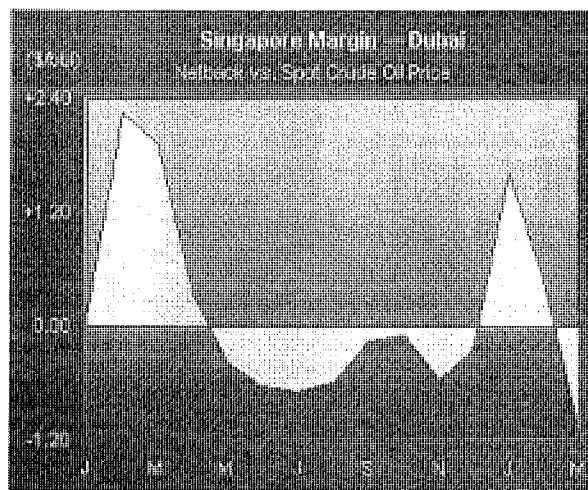
Valero, the US' largest independent refiner, is on a mission to persuade Wall Street investors to make a long-term commitment to the refining sector. Most analysts still advise investors to buy refining stocks in the fall and to sell them in the spring, seeing no reason to hold the shares as long-term investments because of the sector's volatile history. But with the exception of 2002, when the economic fallout of the Sep. 11, 2001, terrorist attacks wiped out product demand in the US, Valero has posted record profits every year since 2000, and during that time its shares have consistently outperformed the S&P 500 index. Valero Chairman Bill Greehey says analysts are "stuck in the past" and ignoring the sweeping changes in the US downstream such as increasingly constrained refining capacity and a movement toward clean and boutique fuels over the past four years -- factors that have created a new era of durably stronger refining margins. Meanwhile, analysts claim that refinery shares have peaked and they are betting that US refining margins will crumble.

Heavy spring turnarounds helped bootstrap European refining margins. Even so, benchmark Brent still loses the best part of a dollar in a typical Rotterdam upgrading unit, while gas oil-rich Russian Urals makes close to a \$1/bbl profit, thanks mainly to recent spikes in European diesel prices (p6). Germany's largest refinery, the 310,000 b/d Miro plant at Karlsruhe, in which Shell, Exxon, Ruhr Oel and ConocoPhillips have stakes, has just restarted from a six-week turnaround, during which time Total's nearby 212,000 b/d Leuna refinery and Total/BP's 210,000 b/d Schwedt refinery have also been offline. Regional refiners may need to rethink their usual turnaround schedules if US summer gasoline demand continues to start so early in the year. Traditionally, refiners have tried to take advantage of the lull between winter heating oil and summer gasoline demand to shut down for maintenance. Less than 5% of Europe's nameplate capacity is expected to be offline next month, versus 10% in March and April.

Asian refiners are only just starting their usual second-quarter maintenance. But shutdowns, some of them voluntary, are already beginning to affect margins. Dubai crude just about breaks even in a Singapore reformer, a marked improvement on the \$1.50/bbl loss it made this time last month. Japanese refiners are shaving back their throughput rates in April. Nippon Oil, Japan's biggest refiner, plans to run its plants at a combined average of 1.09 million b/d in April, down only marginally from 1.11 million b/d in March. But No. 2 refiner Idemitsu aims to run its plants at a combined 434,000 b/d in April, a decrease of 44,000 b/d from March and 24% below year-earlier levels. Both companies cited weaker demand for fuel oil from Japanese utility Tepco, which is bringing more nuclear plants back online, a significant factor in the decision to reduce throughput rates (p10).

Refining Netbacks: Outages Buoy Margins





NETBACKS FOR OTHER CRUDES & CONFIGURATIONS						
US GULF COAST (Cracking)						
	Apr.	Mar.	Feb.	Jan.	Dec.	Nov.
Saudi Arab Heavy-27	30.15	30.07	27.79	27.74	24.69	24.19
Kuwait Kuwait-31	31.05	30.93	28.67	28.61	25.37	24.84
Nigeria Forcados-30	34.03	34.23	33.36	33.14	29.52	29.46
Algeria Saharan-44	36.01	35.98	34.78	33.42	29.46	29.64
US W. Texas Sour-33	36.34	36.28	34.95	35.21	31.29	30.52
ANS-27 (Gulf)	35.01	34.92	33.74	34.37	30.75	30.23
Mexico Maya-22	31.24	30.81	28.58	28.36	25.64	26.39
Isthmus-34	34.75	34.69	32.81	32.86	29.27	29.22
Venezuela Bachq.-17	29.40	28.89	26.73	26.94	24.38	25.85
Tia Juana-26	32.55	31.97	29.88	29.57	26.41	27.43
Ecuador Oriente-30	34.41	34.05	32.20	32.28	28.52	29.42
MEDITERRANEAN (Reforming/Cracking)						
Saudi Arabia Lt.-34	26.41	26.82	24.41	25.65	22.99	23.72
Heavy-27	22.49	22.66	21.15	21.39	18.85	20.36
Iran Light-34	26.11	26.52	24.14	25.36	22.76	23.46
Dubai Fateh-32	26.28	26.70	24.30	25.57	22.96	23.67
Kuwait Kuwait-31	24.04	24.31	22.42	23.08	20.49	21.66
Iraq Kirkuk-37	28.16	27.97	26.35	26.59	24.34	25.42
Nigeria Bonny Lt.-37	30.61	31.05	28.25	29.27	27.08	27.93
Algeria Saharan-44	30.95	31.06	28.37	29.42	27.20	27.54
Libya Zueitina-41.5	31.31	31.47	29.04	30.45	28.12	28.39
Russia Urals-33	28.36	28.75	26.66	27.92	25.44	26.33
UK Brent Blend-38	29.90	30.23	27.38	28.73	26.01	27.00
ROTTERDAM (Reform/Cracking)						
Saudi Arabia Heavy-27	24.20	24.01	22.11	22.66	20.92	22.26
Iran Light-34	27.54	27.57	24.98	25.94	24.04	24.58
Kuwait Kuwait-31	25.74	25.63	23.45	24.17	22.39	23.35
Iraq Kirkuk-37	29.90	29.79	27.44	28.38	26.49	26.97
Nigeria Forcados-30	31.11	31.29	28.44	28.89	27.46	28.25
Algeria Saharan-44	31.96	31.63	29.20	29.54	27.87	28.09
Libya Zueitina-42	32.20	31.80	29.50	29.78	28.20	28.44
Norway Ekofisk-43	32.65	32.64	29.70	30.64	28.40	28.68
Statfjord-38	32.72	32.80	29.83	30.96	28.86	29.10
SINGAPORE (Topping/Reforming)						
Saudi Arabia Heavy-27	26.77	26.37	26.01	27.19	24.90	24.51
Kuwait Kuwait-31	28.29	28.00	27.54	28.98	26.39	25.74
Indonesia Ardjuna-37	32.06	32.56	31.72	33.27	31.09	29.85
Attaka-42	33.62	33.64	32.82	35.44	32.34	30.96
Australia Gippsland-47	31.81	31.83	31.02	33.34	30.50	29.31
China Daqing-33	28.37	29.19	28.18	28.74	28.11	27.19

The spot product market price data used in OMI and the above calculations come primarily from Reuters. Daily product price reports for Europe, the US, and the Asia-Pacific region are available from: Reuters, Attn: Paulo Nery, 85 Fleet Street, London, EC4P 4AJ. Phone: (44-207) 542-6866. Fax: (44-207) 353-9909

SOPHISTICATED UPGRADING REFINERIES						
US GULF COAST (Coking)	Apr.	Mar.	Feb.	Jan.	Dec.	Nov.
Saudi Arabia Lt.-34	34.18	34.44	32.41	32.68	28.26	26.86
UK Brent Blend-38	36.27	36.35	34.53	33.57	29.19	29.10
US W. Texas Int.-40	38.76	38.82	37.16	37.44	32.63	31.43
W. Texas Sour-33	37.95	38.01	36.38	36.57	31.92	30.71
Mexico Maya-22	34.11	34.12	32.27	32.41	28.25	27.91
ROTTERDAM (Cracking)						
Saudi Arabia Lt.-34	30.20	29.98	27.21	27.85	25.76	26.12
UK Brent Blend-38	34.46	34.22	31.08	31.62	29.25	29.65
Kuwait Kuwait-31	27.87	27.59	25.17	25.62	23.62	24.42
Russia Urals-33	31.95	31.74	29.11	29.80	27.84	28.50
EXPORT REFINERIES						
Country/Refinery/Crude						
S. Arabia Yanbu/Arab Lt.-34	33.88	33.60	33.07	34.95	31.94	30.77
Jubail/Arab Lt.-34	29.60	29.36	28.90	30.54	27.91	26.88
Rabigh/Arab Lt.-34	23.72	23.53	23.16	24.48	22.37	21.55
Bahrain Bahrain/Arab Lt.-34	29.40	29.19	28.73	30.37	27.75	26.73
Abu Dhabi Ruwais/Murban-39	31.08	30.83	30.34	32.07	29.30	28.23
Algeria Skikda/Saharan-44	31.04	31.45	29.42	31.22	28.96	28.76
Libya Ras Lanuf/Es S.-Zueit.-42	28.36	29.05	27.02	28.95	27.04	27.25
Venezuela Amuay/Bach.-17	34.40	33.80	31.27	31.51	28.53	30.24
Cardon/TJ Lt.-31	33.08	32.50	30.07	30.30	27.43	29.08
Curacao/TJ Lt.-31	29.53	29.02	26.85	27.06	24.49	25.96

KEY CRUDE OIL NETBACK VALUES & MARGINS												
PRICES	Recent Weekly Prices						Monthly Prices					
	Apr. 5-Mar. 29			Mar. 22-Mar. 15								
	Apr. 9	Apr. 2	Mar. 26	Mar. 19	Mar. 12	Mar. 5	Mar.	Feb.	Jan.	Dec.	Nov.	Oct.
							Mar.	Feb.	Jan.	Dec.	Nov.	Oct.
US GULF COAST (Cracking)												
Saudi Arabia Lt.-34	32.10	31.97	33.05	32.45	32.10	30.05	30.22	26.68	25.85	27.98	25.02	31.01
Dubai Fateh-32	32.42	32.21	33.24	32.71	32.35	30.36	30.70	26.98	26.16	28.34	25.43	31.29
UK Brent Blend-38	35.07	34.70	35.21	35.27	34.88	33.31	32.38	28.62	28.89	29.70	28.16	33.47
US W. Texas Int.-40	37.60	37.60	38.18	37.97	37.65	36.20	36.56	32.20	31.29	31.81	29.79	34.89
Nigeria Bonny Lt.-37	36.68	35.94	36.40	36.43	36.13	34.74	33.98	29.93	30.02	31.14	29.33	34.61
ROTTERDAM (Reforming/Cracking)												
Saudi Arabia Lt.-34	28.38	27.60	28.46	28.51	27.97	25.41	26.38	24.50	24.99	26.50	23.74	27.09
Dubai Fateh-32	28.15	27.45	28.33	28.37	27.83	25.25	26.24	24.37	24.88	26.41	23.72	27.03
Russia Urals-33	30.26	29.76	30.21	30.50	30.01	27.54	28.58	26.85	27.55	27.44	25.47	27.92
UK Brent Blend-38	31.69	31.58	32.15	32.35	31.74	28.77	29.79	27.70	28.30	28.53	26.89	29.52
Nigeria Bonny Lt.-37	32.23	31.54	32.21	32.73	31.92	29.09	29.31	27.74	28.42	28.79	26.67	29.56
SINGAPORE (Topping/Reforming)												
Saudi Arabia Lt.-34	29.98	30.01	30.14	29.72	29.88	29.29	30.95	28.18	27.26	27.36	25.43	27.35
Dubai Fateh-32	29.64	29.68	29.85	29.46	29.60	29.01	30.55	27.97	27.07	27.10	25.22	27.05
Indonesia Minas-34	29.97	30.36	31.02	31.14	31.05	30.16	30.78	29.66	28.58	26.93	25.52	25.98
Malaysia Tapis-43.5	33.22	33.27	33.54	33.38	33.50	32.82	34.72	32.00	30.67	29.06	27.36	28.59
Nigeria Bonny Lt.-37	30.52	31.00	31.91	31.29	31.35	30.11	31.88	29.27	27.72	27.89	25.18	27.32
REFINING MARGINS												
US GULF COAST (Cracking)												
Saudi Arabia Lt.-34	-2.14	-2.15	-2.29	-2.43	-2.34	-2.36	-2.46	-1.58	-1.01	-1.02	-1.05	-1.14
Dubai Fateh-32	+2.65	+2.14	+2.13	+1.76	+1.66	+1.85	+1.77	-1.23	-1.47	+1.15	+0.06	+3.65
UK Brent Blend-38	+2.56	+2.52	+1.49	+0.71	+1.13	+2.44	+1.21	-1.28	+0.05	+0.13	+1.11	+3.70
US W. Texas Int.-40	+1.94	+2.37	+1.62	+0.14	+0.94	+1.70	+2.33	+0.06	+0.23	+1.46	+1.48	+3.29
Nigeria Bonny Lt.-37	+3.33	+2.88	+1.95	+1.21	+1.71	+3.53	+2.58	-0.16	+0.93	+1.09	+1.96	+4.52
ROTTERDAM (Reforming/Cracking)												
Saudi Arabia Lt.-34	-5.87	-6.52	-6.89	-6.37	-6.46	-7.00	-6.30	-3.77	-1.87	-2.49	-2.32	-5.06

Refining Netbacks: Outages Buoy Margins

Dubai Fateh-32	-1.62	-2.62	-2.78	-2.58	-2.86	-3.26	-2.69	-3.84	-2.74	-0.78	-1.66	-0.61
Russia Urals-33	+0.75	+0.32	-1.34	-2.06	-1.53	-0.40	-0.20	-1.44	+0.14	-0.82	-0.20	-0.89
UK Brent Blend-38	-0.82	-0.61	-1.57	-2.21	-2.00	-2.09	-1.38	-2.20	-0.54	-1.05	-0.16	-0.26
Nigeria Bonny Lt.-37	-1.12	-1.51	-2.24	-2.49	-2.49	-2.12	-2.09	-2.34	-0.66	-1.27	-0.70	-0.53
SINGAPORE (Topping/Reforming)												
Saudi Arabia Lt.-34	-4.27	-4.11	-5.21	-5.16	-4.56	-3.12	-1.73	-0.08	+0.40	-1.64	-0.63	-4.80
Dubai Fateh-32	-0.13	-0.39	-1.26	-1.49	-1.09	+0.50	+1.63	-0.24	-0.55	-0.10	-0.15	-0.59
Indonesia Minas-34	-0.26	-0.19	-1.14	-1.60	-1.03	+0.76	+0.27	-2.31	-1.35	-2.32	-0.94	-2.42
Malaysia Tapis-43.5	-0.65	-0.68	-1.27	-2.13	-1.98	-1.87	+1.04	+0.88	+0.23	-2.51	-2.00	-2.08
Nigeria Bonny Lt.-37	-2.83	-2.05	-2.54	-3.94	-3.07	-1.10	+0.48	-0.82	-1.37	-2.16	-2.19	-2.77

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Fire doused at Baytown chemical plant

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April 1, 2004, 8:20PM

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A naphtha processing unit caught fire at the Exxon Mobil chemical plant in Baytown early this morning, but the blaze was under control in an hour, a company spokeswoman said.

The incident in a "naphtha rerun unit" occurred at 1:30 a.m. CST, said Exxon Mobil spokeswoman Tricia Thompson. She said it was not an explosion, just "a fire and a noise."

The fire was out by 2:30 a.m. CST, Thompson said, and there were "no discernible emissions" and no one was injured.

The unit was shut down after the igniter for the natural gas-fired furnace on the unit went out, Thompson said. The igniter is like a pilot light for a home water heater. When the naphtha rerun unit detected the igniter was off, it automatically shut off the flow of natural gas to the unit's furnace, Thompson said. A small fire

caused by residual natural gas in the unit was quickly extinguished, she said.

"There is no indication of foul play," Thompson said.

Other units at the chemical plant continue to operate normally as does the adjoining 525,000 barrel per day Exxon Mobil refinery, the largest in the United States.

This is the second incident at a refinery/chemical plant complex in Texas this week.

On Tuesday night, an ultraformer at BP Plc's 460,000 bpd refinery in Texas City blew up and burned. The cause of that blast is believed to be accidental.

BP said the Texas City refinery was operating at near normal rates Wednesday.

The U.S. Federal Bureau of Investigation warned refiners in Texas last week of an unsubstantiated threat to attack a refinery in the state before the U.S. national elections in November.

Refiners have been constantly increasing security at their plants since the Sept. 11, 2001 terrorist attacks.

Chronicle reporter Cindy Horswell and Reuters News Service contributed to this report.

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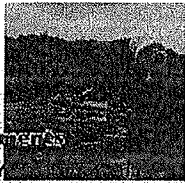
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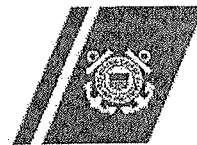
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DATE: August 2, 2004 11:31:02 AM CDT

FOR IMMEDIATE RELEASE

Office of Public Affairs
U.S. Coast Guard

**U.S. Department of
Homeland Security
United States
Coast Guard**



Press Release

Date: Aug. 2, 2004

Contact: Lt. Ian Bird
(409) 723-6509 x262

COAST GUARD RESPONDING TO MAJOR OIL SPILL IN THE NECHES RIVER

PORT ARTHUR, Texas – The Coast Guard, along with other state and local agencies, is responding to an estimated 30,000-gallon fuel oil spill in the Neches River.

The spill occurred at approximately 12:20 a.m. today when a barge struck and pierced the starboard fuel tank of the tanker *Torm Mary*. The *Torm Mary* was at the Sun Anchorage for a routine refueling operation. The Coast Guard has closed a section of the Neches River from Buoy 42 (just north of DuPont plant and the Naval Reserve Fleet) to the Veteran's Bridge.

A Coast Guard broadcast notice to mariners has been issued to inform the local ship traffic of the river closure. The Sabine pilots association and barge companies have terminated all river traffic to the area. Coast Guard Marine Safety Office Port Arthur is on scene, pursuing cleanup and monitoring operations. Federal funding from the National Pollution Funds Center (NPFC) has been authorized to offset costs.


The *Torm Mary* is a 528-foot Danish-flagged tank ship carrying Eurograde Gasoline.

The Coast Guard is investigating the cause of the incident.

Coast Guard responding to major oil spill in the Neches River

The NPFC web site is <http://www.uscg.mil/hq/npfc/index.htm>

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**U.S. Department of
Homeland Security
United States
Coast Guard**



Press Release

Date: Aug 11, 2004
Contact: Lt. Ian Bird
(409) 723-6509 x262

UPDATE 7 - NECHES RIVER OPEN TO ALL TRAFFIC

PORT ARTHUR, Texas -- The Neches River has been reopened to recreational boaters as of 7 a.m. today.

The Neches River had been partially closed and limited to restricted traffic since Aug. 2 when the tank ship Torm Mary was struck, causing a 25,200-gallon oil spill affecting 28 miles of the Neches River shoreline.

The Neches River is now open to all traffic; however, boaters are asked to slow down and use caution when transiting the areas between Unocal and Motiva where cleanup efforts continue. Heavy wakes from passing boats can create unsafe conditions for cleanup crews. The Coast Guard will be patrolling the area to ensure that boaters operate their vessels at a slow, safe speed and stay away from cleanup crews and equipment.

Port Neches Park remains temporarily closed while cleanup operations continue.

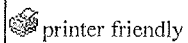
Cleanup costs rise as river clean up continues, and the latest figures from the unified command put the cost at approximately \$5.8 million.

A claims number has been set up for anyone who has had his or her property damaged by the oil spill; the number is (888) 850-8486.

If anyone observes any oiled wildlife, they are requested to immediately contact the Texas Parks and Wildlife at (281) 842-8100. Please do not attempt to capture any wildlife.

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Update 7 - Neches River open to all traffic

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